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SUMMER COURSES IN GEOGRAPHY

AT the coming summer sessions of the leading educational institutions, geography will receive somewhat more than its customary share of time and attention. Nearly all of the courses given last summer will be repeated, and several new and additional courses, particularly in commercial geography, in laboratory and field work, and in special methods in geography, will be offered. These new courses, with but few exceptions, are planned primarily for teachers, and are of much greater variety than have previously been given. Not only are there more courses for teachers of geography in high and normal schools, but a larger number of special courses have also been provided for teachers of geography in the grades. In the following summary of the principal courses in geography and allied subjects to be given during the summer of 1903, detailed information regarding cost of tuition, board, etc. has not been included. Such information, together with a more complete statement of the scope and method of the various courses, is generally given in the circulars and catalogues of the several institutions.

COURSES IN GENERAL GEOGRAPHY

THE UNIVERSITY OF CHICAGO, Chicago, Ill. *The General Principles of Geography.* Assistant Professor J. PAUL GOODE.

The geographic factors of location, structure and clime involved in the present distribution and the social and economic status of peoples. An introductory course, intended to give the student the proper conception of geography and an acquaintance with some of the standard literature of general geography. *July 25–September 3.*

HARVARD UNIVERSITY, Cambridge, Mass. *General Geography.* Mr. HENRY T. BURR, assisted by Mr. FREDERICK M. WILDER.

A course for teachers of geography in grammar and high schools who wish to inform themselves on the methods and results of modern

geographical study. The subjects treated in the lectures and illustrated in the laboratory and field work will include: Physical features of the lands; classification of land forms; the earth as a globe; meteorology; oceanography; geographical controls of the distribution of plants and animals; geographical factors in the history of man. *July* 6–*August* 14.

THE UNIVERSITY OF TENNESSEE, Knoxville, Tenn. *The Elements of Geography.* Professor RICHARD E. DODGE, of the Teachers' College, Columbia University.

The shape, size and motions of the earth and effect upon life conditions; plant forms, their significance, classification and distribution; physical features of eastern United States, especially the southern Appalachians, and their relation to life conditions. Special attention to relation of the physical features to early history, and to commerce, transportation, manufactures, and agriculture. Lantern illustrations and field excursions. Five hours. Six weeks. *June* 23–*July* 31.

THE UNIVERSITY OF MINNESOTA, Minneapolis, Minn. *General Geography.* Professor E. M. LEHNERTS, of the State Normal School, Winona, Minn.

A course planned for advance students and teachers desiring to review the general principles and facts of geography. The following subjects are considered: (1) The fundamental facts and principles of mathematical and physical geography and their relation to the distribution of life and the industries of man; (2) The western hemisphere, with special emphasis on the geography of the United States; (3) The continents and countries of the eastern hemisphere and their commercial relations with the United States. Lectures, recitations, and laboratory work. Five hours a week. *June* 22—*July* 31.

STATE NORMAL COLLEGE, Ypsilanti, Mich. *General Geography.* Mr. MAGERS.

A course of lectures on the continents with references for reading. The lectures will give an account of the physical and climatic features now regarded as most evidently governing human occupation of the different portions of the earth. Four hours a week. *Six weeks in July and August.*

GEOGRAPHY OF THE LAND

COLUMBIA UNIVERSITY, New York City. *General Geology.* Professor A. W. GRABAU.

A course in the elementary principles of geology from the physical point of view. The course includes: The development of topographic forms; their relation to life; instruction in the making of geologic

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sections; practice in reading and interpreting topographic maps and models; half-day excursions in the vicinity of New York. *July* 8–*August* 19.

CORNELL UNIVERSITY, Ithaca, N. Y. *Physical Geography of the Lands.* Professor RALPH S. TARR.

A course in modern physical geography or physiography of the lands, with special stress placed upon the questions relating to the origin and life history of land forms and their influences on man. Four hours a week. *July* 6–*August* 15.

HARVARD UNIVERSITY, Cambridge, Mass. *Elementary Geology.* Professor N. S. SHALER and Professor J. E. WOODMAN.

Designed particularly for teachers and others who wish to acquire an elementary knowledge of geological processes and forms, and to learn field methods. Especially recommended for those intending to study physiography. Lectures and excursions. *July* 6–*August* 14.

THE UNIVERSITY OF CHICAGO, Chicago, Ill. *A Teachers' Course in Physiography.* Professor R. D. SALISBURY.

A study in the evolution of land forms, with especial reference to North America. Two hours daily. *June* 17–*July* 24.

UNIVERSITY OF WISCONSIN, Madison, Wis. *Physiography.* Professor N. M. FENNEMAN.

A course designed for (1) teachers who wish to come into touch with the subject as it is seen in the field, and (2) students wishing dynamic rather than historical geology. Lectures and excursions. *July* 6–*August* 14.

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich. *Physical Geography.* Professor M. S. W. JEFFERSON.

A course planned, primarily, for teachers. Emphasis is placed on the principles of the science; its relationship to other sciences; and the study of topographic forms. Lectures and excursions. *July* 1–*August* 14.

EASTERN ILLINOIS STATE NORMAL SCHOOL, Charleston, Ill. *Land Sculpture.* Assistant Professor J. PAUL GOODE, of the University of Chicago.

The physical features of the earth, and the agents and processes involved in their evolution,—the idea of the geographic cycle. Constant attention is called to the ways in which land forms influence human life. Lectures, recitations, field trips and laboratory work. *June* 22–*July* 31.

INDIANA STATE NORMAL SCHOOL, Terre Haute, Ind. *The Development of Land Forms,* with daily field and laboratory work. Professor MCBETH. *June* 29–*August* 7.

GEOGRAPHY OF THE ATMOSPHERE

THE UNIVERSITY OF CHICAGO, Chicago, Ill. *Elementary Meteorology.* Assistant Professor J. PAUL GOODE.

This course will include: The principles of meteorology; the general atmospheric circulation; charting of weather elements; forecasting. *July* 25-*September* 3.

INDIANA STATE NORMAL SCHOOL, Terre Haute, Ind. *Meteorology.* Professor CHARLES R. DRYER.

A study of the atmosphere, weather and climate, with daily laboratory work and instrumental observations. *June* 29–*August* 7.

EASTERN ILLINOIS STATE NORMAL SCHOOL, Charleston, Ill. *Meteorology.* Assistant Professor J. PAUL GOODE, of the University of Chicago.

A study of the atmosphere: its general and secondary circulations; particular emphasis on the cyclonic storm; interpretation of the U. S. weather map; charting of weather elements. *June* 22–*July* 31.

GEOGRAPHY OF PLANTS AND ANIMALS

THE UNIVERSITY OF CHICAGO, Chicago, Ill. Three Courses:

Elementary Ecology. Dr. HENRY CHANDLER COWLES.

A course treating of plants in relation to their environment, dealing with plant structures and functions and their modifications under different conditions of environment. *First term, June* 17–*July* 25.

Physiographic Ecology. Dr. COWLES.

A course treating of plant societies in relation to the physiographic development of land forms, origin, culmination, and decay of the various plant societies. Prerequisite: Elementary Ecology. *First term, June* 17–*July* 25.

Field Ecology. Dr. COWLES and assistants.

A course which applies the principles of physiographic ecology to some region. The entire time of the class is devoted to this study. It is expected that in 1903 one party will visit northern Michigan while another party will work in Arizona, studying the desert, the San Francisco Mountains, and the Canyon. Prerequisite: Physiographic Ecology. *Second term, July* 25–*September* 1.

UNIVERSITY OF MICHIGAN, Ann Arbor, Mich. *Field Ecology.* Mr. CHARLES C. ADAMS.

A course intended as an introduction to the study of the relation of animals to their natural environment. Lectures, conferences and field trips. *July* 1–*August* 14.

THE UNIVERSITY OF CHICAGO, Chicago, Ill. Three Courses:

Zoogeography. Professor DAVENPORT and Mr. LARGE.

Lectures, conferences and field work on the principles of the geographic distribution of animals, with special reference to evolution.

Field Zoölogy. Introductory Course. Dr. CHILD.

Study of the more common animals of the region about Chicago, including work on life histories, habits, classification and distribution. *First term, June* 17–*July* 25.

Field Zoölogy. Advanced Course. Dr. CHILD.

Study of the fauna of the region about Chicago, with special reference to the relations between animals and their surroundings. Each student is expected to devote a considerable portion of his time to the study of some special problem connected with the work of the course, and to present the results of this work in the form of a thesis at the end of the course. *Second term, July* 25–*September* 3.

COMMERCIAL GEOGRAPHY

CORNELL UNIVERSITY, Ithaca, N. Y. *Commercial Geography.* Mr. PHILIP EMERSON.

A general study of commercial geography, with special relation to the position held by the United States in the commercial struggle of the present time. The history of commerce and of industry; the physical controls of commerce; the great commercial staples and the development of allied interests; the commerce and industry of the United States and the leading commercial nations and regions. Five hours a week. *July* 6–*August* 15.

UNIVERSITY OF MINNESOTA, Minneapolis, Minn. *Commercial Geography.* Professor E. M. LEHNERTS, of the State Normal School, Winona, Minn.

A course on the world's great products and industries. The work will be made as concrete as possible by means of actual specimens, photographs, and lantern slides; and the lectures and recitations will be supplemented by laboratory work and by excursions to factories and mills in Minneapolis and vicinity. *June* 22–*July* 31.

THE UNIVERSITY OF CHICAGO, Chicago, Ill. *Commercial Geography.* Dr. H. R. HATFIELD.

A course in general geography with special emphasis on the commercial side. *June* 17–*September* 3.

UNIVERSITY OF WISCONSIN, Madison, Wis. *International Commerce.* Professor J. C. MONAGHAN.

A general survey of the resources and industries of the chief

commercial nations, followed by a study of their present commercial relations and of the problems to which these give rise. *July* 6–*August* 14.

GEOGRAPHY OF THE UNITED STATES AND EUROPE

CORNELL UNIVERSITY, Ithaca, N. Y. *The Geography of the United States.* Professor A. P. BRIGHAM.

A lecture course treating of the physiographic features of the United States, with reference to the history and industrial development of the several sections of the country. The principal sub-topics are: (1) The geological history of the continent; (2) its climatic features; (3) the physiography of the several groups of states with reference to early history, occupations of the people, location of cities, and general development. Three lectures each week, with lantern illustrations. *July* 6–*August* 15.

UNIVERSITY OF WISCONSIN, Madison, Wis. *Physiography of the United States.* Professor N. M. FENNEMAN.

This course takes up the several physiographic provinces of the United States. Land surfaces of various origins are exemplified in different stages of development. The influence of geological history on habitation receives attention. Lectures and field trips. *July* 6–*August* 14.

CORNELL UNIVERSITY, Ithaca, N. Y. *The Geography of Europe.* Professor TARR.

A consideration of the physiographic features of Europe and their influence upon the history and industrial development of the several nations. The principal sub-topics are: (1) Physiography of the continent and its development; (2) climate from the standpoint of cause and effect; (3) natural resources; (4) influence of these various physiographic features upon race characteristics, early movements of people, development of navigation, modern national development, and location of leading cities, both in the past and the present. Fully illustrated with lantern slides and maps. *July* 6–15.

THE INDIANA STATE NORMAL SCHOOL, Terre Haute, Ind. *The Geography of the United States, Physical and Political,* with map drawing on mathematical projections. Professor CHARLES R. DRYER. *June* 29 –*August* 7

LABORATORY AND FIELD COURSES

THE UNIVERSITY OF CHICAGO, Chicago, Ill. Four Courses:

A Local Field and Laboratory Course. Mr. W. W. ATWOOD.

This course involves a study of the surroundings of Chicago; the

use of topographic and geologic maps; chalk modeling, etc. *First term, June* 17–*July* 25.

A Field Course in Geology and Geography, centering about Devil's Lake and the Dells of the Wisconsin, in Wisconsin. Mr. BLACKWELDER.

Open only to those who have had college courses in physiography and general geology. The latter part of the first term is allowed for the preparation of a report on the field work. *June* 19–*July* 17.

A Field Course. Same as above. Mr. DE WOLF.

The party leaves for Wisconsin on July 25 and remains about four weeks in the field. The remainder of the second term is allowed for the preparation of a report on the field work.

An Advanced Field Course. Mr. W. W. ATWOOD.

This party will go to the Wasatch Mountains and Great Salt Lake, Utah, starting July 24th or 25th, and returning about August 22d. The report of the work will be written later.

CORNELL UNIVERSITY, Ithaca, N. Y. Six Courses. *July* 16–*August* 15.

Laboratory Course in Physical Geography. Assistant Principal CARNEY and Mr. MILLS.

A practical course to illustrate the methods and materials available for laboratory and field work in high schools. Attention is given to the possibilities open to the teacher in schools having limited laboratory equipment. Where desired by a teacher, personal suggestions will be made regarding the local field work he may carry on with his classes.

Field Course in Physical Geography. Professor TARR, Assistant Principal CARNEY, Mr. WHITBECK and Mr. MILLS.

One afternoon each week is devoted to the study of physiographic phenomena in the field, and two Saturdays are given to all-day excursions. An excursion to Niagara is also offered in connection with this course, but attendance upon it is voluntary. An excursion to the anthracite coal fields is also open to students in this class.

Laboratory Course in Geology. Mr. G. C. MATSON.

This course is intended to furnish an opportunity for the study of such geological phenomena as are capable of illustration by specimens, maps and models.

Field Course in Geology. Professor BRIGHAM, Assistant Principal CARNEY, Mr. MATSON and Mr. MILLS.

One afternoon each week and two Saturdays are devoted to excursions in the neighborhood of Ithaca. A voluntary excursion to the anthracite coal fields of Pennsylvania is offered. Students of this course are also permitted to go on the Niagara excursion.

Laboratory and Field Work in Commercial Geography. Principal EMERSON.

Two afternoons a week are devoted to laboratory and field study. In this work a study is made of the methods of teaching commercial geography and of studying commerce and industry: (*a*) In the laboratory, by means of selected specimens of raw materials and manufactured products; by photographs illustrative of the world's great industries; by the study of statistics, government reports, and other material in print; and by the making of illustrative maps, charts, and diagrams; (*b*) in the conservatory and garden, where the more important species and varieties of plants that supply the breadstuffs, sugar, fibers and other plant materials entering into commerce, are grown; (*c*) in the factories and mills of Ithaca and vicinity, studying processes of manufacture, and discovering illustrations of principles that underlie modern industry. The work of this course is intended to aid a teacher to plan and form the nucleus of a laboratory of his own, as well as to prepare him to use it effectively. The voluntary excursions to Niagara and to the Anthracite Coal Fields are open to students of this class. A study of the industrial aspects of these regions will be undertaken.

Advanced Course in Dynamic Geology and Physical Geography. Professors TARR and BRIGHAM, with assistants.

Students desiring to do advanced field and laboratory work in dynamic geology or physical geography will be provided with facilities for such work under the supervision of the instructors. This work will vary with the needs of the individual students. The region in the neighborhood of Ithaca offers numerous interesting problems for advanced study.

MINNESOTA SEASIDE STATION, Port Renfrew, British Columbia. Two courses:

District Geology. (An elementary course.) Dean C. W. HALL.

Problems in Geology. (A course for advanced students.) Dean C. W. HALL, Department of Geology, University of Minnesota.

The party leaves Minneapolis about July 15, *via* the Canadian Pacific Railway, making stops of one day each at Banff, Field, and Victoria. After a month of work at Port Renfrew and vicinity the party goes to Glacier and Laggan, and returns to Minneapolis about the first of September.

HARVARD UNIVERSITY, Cambridge, Mass. *Field Work in the Rocky Mountain Region.* Mr. C. H. WHITE.

Opportunity for geological fieldwork for five weeks during the summer, in the Rocky Mountain region, probably in Southern Colorado, will

be provided for a limited number of men students who already have a general knowledge of geology,—conditioned upon the enrolment of seven persons by July 1, 1903. The field work will be under the charge of Mr. C. H. White, from whom a special circular descriptive of the course may be obtained. The party, if organized, will leave Chicago on July 2, 1903. Mr. White's address is Rotch Building, Harvard University, Cambridge, Mass.

SPECIAL METHODS IN GEOGRAPHY

CORNELL UNIVERSITY, Ithaca, N. Y. Four Courses. *July* 6–*August* 15.

Type Studies in Geography for Grammar Grades. Professor CHARLES A. MCMURRY.

The selection of important topics as types in geography; illustrations of type studies in North America, Europe and other lands; the principles of method, illustrated by such type studies; relation of such studies to text-books in geography; the course of study in geography, and the value of earlier lessons to the interpretation of later lessons in the course; the method of oral treatment of some topics; reviews and comparisons.

Home Geography. Professor CHARLES A. MCMURRY.

This course gives emphasis to the important elements of geography in the home neighborhood. It is an analysis of those geographical facts and materials which lie within the range of the children's senses. The necessity for this study as a basis for later book and map studies of the large world beyond is illustrated. The topics of home geography; study of excursions with classes of children; the oral treatment of topics in the class-room work; the relation of home geography to the later geography study and to text-books; a course of study showing the leading topics in this transition from the home neighborhood to the state and the United States; leading topics of the home state and their treatment; the study of the earth-whole in the early years, and its relation to the child; means of illustrating the earth-whole and its parts.

Class-Room Problems in Geography. Mr. WHITBECK.

Lectures and discussions pertaining to actual work in the school-room; conduct of the recitation; the use of the text-book; supplementary reading; map modeling and map drawing; collection of materials for a geographical museum; a discussion of the correlation of geography with other subjects; how to develop and maintain interest in geography among pupils.

Laboratory Methods for the Grades. Mr. WHITBECK.

Laboratory and field excursions designed to illustrate the use of laboratory methods in geography in the grades, and to show teachers what inexpensive materials are available; the use of relief maps, contour maps, U. S. Geological Survey folios, and government and state publications generally; the use of models, lantern slides, pictures, outline maps, etc.; the collection of illustrative materials; graded field excursions.

THE UNIVERSITY OF TENNESSEE, Knoxville, Tenn. *Geography Teaching.* Professor RICHARD E. DODGE and Miss CLARA B. KIRCHWEY, of the Teachers' College, Columbia University.

The course of study in geography; guiding principles; particular problems of primary, intermediate, and advanced grammar school work; special attention to the use of the local environment in rural schools and practical application in agricultural communities. Lectures, reading and special problems for individual work; class discussions and criticism. Five hours. Six weeks. *June* 23–*July* 31.

UNIVERSITY OF MINNESOTA, Minneapolis, Minn. *Methods in Geography.* Professor E, M. LEHNERTS, of the State Normal School, Winona, Minn.

The work in this course includes both a review of the subject matter of school geography and the special consideration of methods of teaching it. A course for the grades is outlined, and the matter and the methods of presentation at the several stages are discussed. Lectures, recitations and laboratory work. Ten hours a week. *June* 22–*July* 31.

EASTERN ILLINOIS STATE NORMAL SCHOOL, Charleston, Ill. *Methods in Geography.* Assistant Professor J. PAUL GOODE, of the University of Chicago.

Methods in Geography intended for the more advanced students and teachers. The following subjects are considered: (1) The scope of geography; (2) geography in the grades—the use of the text, the recitation, the excursion; (3) the topical method, the individual report; (4) the best accessory literature; (5) the atlas habit; (6) Graphics—the use of the chalk, the memory map, diagrams and demonstrations, construction of accurate maps, use of models and pictures. Lectures and laboratory work. *June* 22–*July* 31.

STATE NORMAL COLLEGE, Ypsilanti, Mich. *Teachers' Geography.* Professor M. S. W. JEFFERSON.

The course is planned for teachers and advanced students, and deals with topics in mathematical geography, map projections, and the geography of the atmosphere. Lectures, recitations, and laboratory work. *Six weeks in July and August.*

GEOGRAPHICAL TEXT-BOOKS AND GEOGRAPHICAL TEACHING

BY MARTHA KRUG GENTHE, PH. D.
Of the Beacon School, Hartford, Conn.

IN defining the scope of geographical instruction, two requirements must receive due consideration. The one is based on the subject-matter itself—the information which is to be imparted to somebody; we may call this the material requirement. The other deals with this somebody to whom the information is to be imparted, and whose mental disposition must be taken into account if the instruction is to be successful; this may be called the psychological requirement.

In accordance with the former we shall have to look out that the information given by the text-book and by the course in geography be geographical, and nothing but geographical. This may seem a truism, but an examination of the majority of our texts will show that the remark was not unnecessary. Is all the information given in our leading text-books indeed purely geographic? No thorough student of geography who fully realizes the associative character of our science, will deny the difficulty, even in the technical study of the subject, of always drawing the exact boundary between geography proper and other sciences more or less closely related to it, on whose results he has to draw on so many occasions; and larger still is the danger of trespassing on foreign ground in school geography, as long as school programs will continue to require that geography should furnish an introduction to all the sciences. Says Professor Dodge:* "The teaching of North America from the standpoint of industrial centers does not mean an emphasis of technical details of industry, which are neither earth-determined nor earth-influenced except in a very remote way. . . . The geographical phases of industries that to the author seem legitimate parts of school work are mainly their distribution and general character. . . Too great elaboration of details . . . places the emphasis of the work on ungeographic details. . . . A child does not need to study plows and harrows in order to understand the necessity of making soil fine and loose for successful farming, any more than he needs to know the detailed working of a shoe-sewing machine as a basis for understanding that manufacturing consists in turning raw products into

*Geography at the Horace Mann Schools, *Teachers College Record*, Vol. II., No. 2, p. 30.

finished goods." And J. W. Redway:* "In dealing with the question of mathematical geography, it is a very easy matter to commit grievous errors of judgment. . . . For instance, such a problem as the calculation of the longest and the shortest days . . . is both interesting and instructive in its proper place; but it belongs to the study of astronomy," etc. And the New England Association of School Superintendents declares:† "The relationships of geography are so many and so important that there is great liability that matters really extraneous may be included in geography either from carelessness in establishing its proper boundaries or from notions of convenience. That the sun's light gives us day and its absence causes night is no more an astronomical fact than a geographic one. . . . But the distance of the sun from the earth, the names of the planets and constellations, are astronomical matters, not geographical. . . . The industries of man are often geographical facts, because dependent on some local condition, but the processes of the industries are not geographical items any more than those of the arts of commerce. . . . If we teach in our geographies the processes of the industries, why not the art of navigation? . . . The process of an industry may attain the dignity of a geographic fact when it operates to change the location of an industry, or its importance, or its transportation interests; but as a process it belongs rather to technical education than to geography. . . . Geography proper stops with the raw material and transportation."

Such statements, which might be largely multiplied, prove that the material requirement is not always being kept in view in the schools. What has, for instance, the Culloden Monument, or the shattered house at Waterloo, or the old bell in Moscow, to do with geography? (Frye's Complete Geography, pp. 82, 85, 86.) What value has the systematic survey of the botanical and zoölogical realms of the globe, if the animals are presented there separated by dozens of other chapters from the discussion of the countries where they occur, and where alone their occurrence constitutes a geographical factor—as we see it also done in Frye's Geography? In this way the "new" geography becomes just as overloaded with "unconnected detail" as was the old, and in physical geographies the transgressions on physical and geological matter are just as frequent. It is evident, therefore, that the first requirement, commonplace though it may seem, should be very steadily kept in mind by the teacher, and be the gauge on which the relative value of the individual items for the geography lesson is measured.

*The New Basis of Geography, p. 131.

†Report on Geography, presented at the meeting held Nov. 15, 1901, p. 16.

The presentation of the subject-matter thus limited will then be modified by the psychological requirement. This requirement may be threefold. The information being imparted either to a child, or an adolescent, or an adult student, the scope of the work will be either elementary, or advanced, or mature (scientific), a difference which is expressed in the maintenance of three different classes of schools by the state, to accommodate students of the three different stages in their individual ways. The relative importance of the material and the psychological requirements within these stages may be arranged on a kind of sliding scale so that, in the elementary stage, the psychological requirement stands foremost in the course, while in the scientific, the former predominates over the latter, and the stage of adolescense, that of secondary education, presents a transition from the elementary to the scientific treatment. In other words, although the instructor in charge of geography should be a teacher *and* a geographer in all the stages, the defects of the latter will show most in the highest, and those of the former be most fatal in the lowest, stages.

In scientific study, the subject receives attention mainly for its own sake; it is pursued along all its lines and avenues, through all its changing relations and conditions, until a complete survey of the whole field is secured. Scientific correctness and completeness, as needed for the training of scientific geographers, is the essential feature of this course. In elementary teaching, however, the aim of the instruction is the development of the mind and intelligence of the pupil by means of imparting the knowledge to him; not so much the completeness of geographical information on all the questions that may be touched upon, as the fullness, the thoroughness, the oneness of the pupil's conception of that which has been actually brought before him, however small the ground that was covered may appear in comparison with the wide field of the science. The mind of the scientific geographer will not be at ease before he has at least a general acquaintance with, for instance, all the principal rivers of the world; the child in the elementary course may be perfectly satisfied with his teacher if he (the child) knows the one or two rivers of his home, but knows them intelligently, in their bearing on his life, in their correlation and interdependence with natural and human conditions, and if he can infer from them what may be the character of other rivers when he happens to come across them in his reading or by actual experience. In scientific training, knowledge for knowledge's sake may mean, if not everything, at least very nearly everything, in training children. Knowledge is valuable mainly in proportion as its

acquisition means, to the child, so many more steps toward the possession of the power to discern between the false and the true, the power to gather himself new information by the aid of that which he has already acquired.

The bearing of these fundamental differences on the character of the text-books is evident. The scientific text-book must be exhaustive. Its part in the work is that of a reliable guide leading the student to all the highways and byways of the science, and by whose advice the student can find his way through the unknown regions of the subject and needs recur to the teacher only for references or new points of view. The elementary text is radically different. The power of finding things out himself, which the mature student disposes of, is not owned by the child; it has still to be developed in him. This can be accomplished only through the direct and continuous contact with, and the personal influence of, the competent teacher, whose *"viva vox docet;"* therefore the text-book for elementary teaching has not an *informational*, but a distinctly subsidiary and *complementary* character.

The essential difference between the elementary and the scientific text-book is, then, not only one of quantity, but essentially a difference of function. I can imagine two text-books containing exactly the same amount of information, but the one being elementary and the other scientific. I can also imagine two text-books of which the second contains half the information contained in the first, and yet is just as scientific, although being *named* elementary. I can not only imagine such a text-book, I have seen it. The mere change of language does not constitute the different character of the text. We may introduce ever so many pictures, and reduce the text to whatever small size that can be imagined—if our text reads* "A continent is a very large body of land. An island is a much smaller body of land surrounded by water. An archipelago is a number of islands lying near each other. A peninsula is a body of land nearly surrounded by water, An isthmus is a narrow neck of land which connects two larger bodies of land. A cape is a point of land projecting into the water," etc., etc., our teaching is scientific, but not elementary. On the other hand, when we read the following:† " . . . . Krakatoa gave us an information which we greatly wanted. How could we learn what winds were blowing at a height four times as great as the loftiest mountain on the earth and twice as great as the loftiest altitude to which a balloon has ever soared? We could

* Eclectic series, Elementary Geography, p. 7.

† The National Geographic Magazine. Vol. XIII., June 1902, p. 203.

neither see these winds nor feel them. How, then, could we learn whether they really existed? No doubt, a straw will show the way the wind blows; but there are no straws up there. There was nothing to render the winds perceptible until Krakatoa came to our aid. Krakatoa drove into these winds prodigious quantities of dust. Hundreds of cubic miles of air were thus deprived of their invisibility which they had hitherto maintained. They were thus compelled to disclose those movements about which, neither before nor since, have we had any opportunity of learning"—when we read this, I say, in a publication that claims to be scientific, we cannot but say that the scientific publication stoops to be elementary.

After these remarks on general principles, let us enter into a closer study of the special features of the texts and courses needed in each of the three stages. Considering the first stage, it was found that here the child needs quite especially the guiding hand of the teacher, a fact acknowledged by school authorities in the oft-repeated statement that in the elementary school the teacher, not the text-book, should lead the class. But the ideal requirement goes still farther. The ideal would be, on this first stage, a course without any text-book for the children at all. Plain necessity requires that, anyway, no use be made of a text before the child has mastered the technical difficulties of reading, which will not be before the end of the second, or the beginning of the third, school year. Even beyond this stage there is quite a number of school men who demand that no text be introduced before the fourth or even the fifth year, and I may, therefore, believe myself in harmony with the present tendency of educational thought by expressing the wish that absolutely no printed information should be given during the phase generally called home geography, understanding this in its widest sense as home geography proper, the treatment of the first general notions of the earth and the universe, and the first treatment of the United States. An ideal course would, perhaps, try to dispense with a text-book altogether, as is done in many elementary schools in Germany without impairing the standard of geographical teaching; but too much must not be expected at once, and in the grammar grades the help of a text-book as a time-saver may not be rejected if the book is used intelligently.

The right way of using a text-book can, however, not be attained before the child possesses a solid elementary knowledge of the principal geographical facts and ideas, gained by oral instruction in the study of real objects, models, pictures and maps. It is extremely gratifying to watch the recent awakening among teachers to a consciousness of the

importance of outdoor and laboratory work for small children. There is no other way of making geography real to a young mind but by the frequent observation and reproduction of geographic objects. As these first instructions are based on the home environment, every school teacher ought, from the schoolroom to the beginnings of general geography, to lay out an individual course of study for her school, and such a course, prepared by a competent teacher, will be far superior to the conventional course of the average "elementary" text-book. For the "typical" and "simplified" illustrations which we find in such books cannot stand comparison with what the child may see with his own eyes, and the reproductions of relief maps printed therein only convey false ideas of the true elevations of the earth's surface. An actual relief, presenting features of home geography with a moderate exaggeration of altitudes, is one of the most valuable helps to the child for realizing the essentials of land forms, and if made by the child himself, or by the teacher before the eyes and with the assistance of the children, it is still better. But it has always been a problem to me how geographers or teachers can advocate the use of printed relief maps as the main basis for the introduction of children into geography. Imagine studying the reproduction of a reproduction in order to learn to know the original! If the child's own work is not quite exact, no great harm will be done; for, as Frye has stated, to the child the relief presents his highest effort and therefore is perfect, and he sees the real thing through the reproduction which to him is as surely a part of the country as the bundle of rags is a beloved doll. Moreover, the child's product is destroyed as readily as it has been built, so that what was erroneous in it is wiped out before the error can leave a lasting impression on the mind. But when he sees before him, day by day, in a fixed condition, those contorted pictures of the surface of the earth which nine out of ten geographies call relief maps, what must become his ideas of the shape of land forms, of hills and mountains? Will not the whole of the earth's surface take, in his mind, the shape of an aggregation of more or less pointed pyramidal protuberances?

The relief represents an important stage in geographical education and has a very definite mission to fulfil. It furnishes invaluable help for the elementary understanding of land forms, and even the relief map may be useful as a transition from the elementary to the scientific method of their reproduction. But if, instead of this transitory function, we assign the relief map that predominant place in the study of the globe that it is given at present in most of our school geographies, if from the part of an accessory we raise it to that of the exclusive basis

of elementary geographical instruction, all the good that may be derived from it will be as nothing compared with the tremendous harm it must do to the acquisition of correct geographical information.

The erroneous ideas about absolute heights which it conveys have already been dealt with; the misrepresentation of relative heights, unavoidable in reliefs on such a large scale, is no less dangerous. Which child will be able to infer from Frye's relief map of Europe, whether the Alps are higher than the Ural Mountains, or vice versa? whether the interior of the Iberian peninsula is a low plain dissected by mountain ranges, or a plateau traversed by the same? whether valleys of certain rivers are narrow gorges or wide floodplains? or who can see, on the relief map of North America, any difference between the character of the northern and southern parts of the Atlantic coast? Those very features of topography which give physiographic studies their educational value are naturally effaced on relief maps on such a large scale, which, at best, show *where* there are mountains and *where* there are rivers, but are unable to give any expression of physiographic detail. Even mere location seeks in vain for accurate expression on these maps. I wonder whether those who advocate their use have ever stopped to think that none of these maps indicates latitudes and longitudes, or whether they think the location problem a "*quantité négligeable*" in geographic instruction. If not, I invite them to examine—as far as can be done on a map without either parallels or meridians—the locations of some dozen places on the same, and I hope they may afterwards join me in the demand that geographic maps, above all, must be correct, scrupulously correct, even for school use. Even? or had we not better say, for school use *first of all?* It is astonishing how far the principle that for the children the best thing is just good enough has been neglected in the production of text-book maps.

The root of the evil lies in a false conception of the place of the relief map in elementary teaching. Instead of employing the relief map as a connecting link between the actual relief and the real map, the instruction has made halt before these maps as if the goal were reached here already. Yet the next step is near at hand. At first, the children see the object itself; then they reproduce it in sand or clay in all its three dimensions. Then the idea of producing the same in two dimensions only must be brought home to them. This is the mission of the relief map. This map, as a picture of the relief which is familiar to them, presents to them for the first time a two-dimensional reproduction of what they have seen only three-dimensionally before, and they see that by the use

of lights and shades we may see on a sheet of paper almost the same thing which we saw on the relief before. But, instead of stopping here, the children must be led on to find out themselves that this picture, although it seems to them quite like the original, does not tell them all the original tells: namely, that they cannot measure the heights. This may be brought out in the following way: Let the teacher stand in front of the class before the model and ask the children to tell her which places look highest on the same. It will happen that the children on the seats at the back cannot see this very well. Then let the teacher say: "In order that we may all be able to see at a glance where the highest elevations are, even at a distance, I will paint them with a special color"; and let her put a brown cap on all the higher summits, telling the children that these all are above a given number of feet. She will then examine, by pointing alternately at the colored and uncolored places: "Is this above . . feet? Is this? Is that?" etc., until she sees that the children are familiar with the symbol. In the same way the buff for the medium heights and the green or yellow for lowlands may be added. In another lesson, the application of this to the map will be made. The children now appreciate the value of coloring for quick orientation about heights, and when they see the relief map they will soon suggest themselves to perfect it by painting. Then the association of the different colors with the expression of a certain amount of elevation will be so definite in the mind of the children, that in the colored relief map it will no longer be from the lights and shades, but from the brown, the buff, and the green, that they infer whether a given place is high or low. At last, the map will be produced to them with the omission of all shading and nothing but the colors, and after such preparation they will not have the slightest difficulty in seeing the relief through the mediation of the colors.

Nothing at all should be said, of course, about the scientific side of the process at that age, the children must not even hear the word contour lines, but the lines where regions of different coloring meet will be looked at by them quite unconsciously as lines of equal elevation. When afterwards, in the higher grades, the study of the real topographic map is begun, the subject will be nothing essentially new to them, but it will appear as the conscious expression of what they have known unconsciously long before. This is the proper way to impart knowledge: first create the new idea in the mind, making it arise gradually from an unconscious to a half conscious, to a conscious state, and at last, when the existence of the new concept asks itself for an adequate name, give the new word.

The first map, that of the home, might have just the three fundamental colors; the area being small, no need for more differentiation is likely to present itself. The same number may be used on the first map of the United States, but here the children will see that the same distribution of heights among the colors is not practicable, and will feel the need for giving the colors a somewhat changed meaning. So they experience personally that the adoption of the *meaning* of the colors is arbitrary, and they will also find that in a country with varied and high elevations a greater differentiation of the same is advisable. Then may be added a dark brown for the highest elevations. This will do for the first survey of the world and the continents which will be "done" at the end of the fourth school year. In the grammar grades, the scale of colors is developed still farther, until two or three shades of each color, and white for glacier regions, make up a graded scale by whose aid the children can easily read from the map the approximate height of any part of the earth. If the study of cartography is carried on in this way logically and continuously, growing up together with the geographic development of the child through all the grades, nobody will be found any longer to maintain that "the system (of contour maps) is so purely a conventional one that even long training and much experience do not enable one to determine the character of the relief."* It will then be recognized that the signs of the maps are no more conventional than the letters of books which, also, to the beginner, present nothing but a maze of bewildering signs, while to the one who knows them they are full of interesting information. Moreover, if no conventional signs shall be given on elementary maps, the principle requires that contours should not be the only feature against which the boycott be declared. If we banish contour, why not other symbols? If it is required that the child see the mountains on the maps "as they are," not conventionalized, why shall he not see also the cities, the railroads, the vegetation as they are? Why, then, do we not, as the old geographers did, people our maps with the pictures of all the other curiosities of the country in order to avoid "conventional" representation? If it is a fact, as I will believe the writer, that "no one person in a thousand understands a contoured map,"† it is not the fault of the map, but of *the lack of training in map reading* in the schools. In other countries, where geography has been taught longer in accordance with the new ideas of the science, the same observation is not made. So

*Mindeleff, Geographical Relief Maps. Bull. Amer. Geog. Soc. Vol. XXXII. 1900, p. 371.

†Mindeleff, Ibid., p. 370.

let us hope that this country, whose opportunities for the use of government maps are unparalleled all over the world, will no longer consent to let the generous work of the topographic bureau be entirely lost for school teaching."*

The task of the teacher of home geography appears, then, to be this: First, to give the child an elementary knowledge of the state and conditions of his home; secondly, to let him gain in this work such an elementary acquaintance with the principal objects, processes, and laws of geography as may serve as a basis for the intelligent study of the world in higher grades; thirdly, to lead him through the observation and reproduction of real objects to an understanding of the conventional language of cartography, that he may read it as he would the words in a book, to gain from the map all the information which he needs and which it can give him.

The method, during this introductory study, should of course be entirely oral and conversational, nothing else furnishing material for the talks of teacher and pupils but the study of real objects, of pictures, of maps, and the reproduction of the same, insomuch as it can assist a clearer perception of the real thing. But no text-book should stand between teacher and pupil; the teacher, not the text, will define the course of instruction, and no home study of printed matter should ever be assigned. Instead of the "elementary" text-book there should be a local manual for the use of the teacher in her preparation for the lessons (never to be seen in the schoolroom!); a liberal supply of pictures; a series of wall maps of school district, town, (county,) and state, if possible, both colored and uncolored, (the coloring can be done by the teacher); a colored contour map of the United States; and last, not least, a good-sized globe. For the use of the children, a little booklet containing smaller editions of these same maps, together with a few outline maps for practical exercises, a supply of moulding boards or tin trays as described by Frye for sand modeling, and a number of small globes.

This would be the first part of the elementary course, purely preliminary, embracing the first years up to the end of the fourth school year.

*I wish to call especial attention to the beautiful Colored Contour Map of the U. S., 18x28 inches, and suggest its use in schools for the purpose. It may furnish an excellent transition to the study of pure contour maps, as the same has also been published without coloring, with contours alone. Another edition of the same is entirely without indication of heights, so that we have here the complete graduation: a) the map which lacks the expression of heights, b) heights expressed by coloring, c) heights expressed by contour alone. Price 10c. each; one hundred or more, 4c. each.

The main difference of the second part, which is given in the grammar grades, lies in the use of the textbook, which is now introduced. The whole teaching is now given on a broader basis, but it is still elementary; the name of "advanced" geography, that is sometimes given to texts for this stage, is a dangerous misnomer. A really advanced treatment of the subject is not possible below the high school, first, because the children are too young; secondly, because a first instruction on any given subject—and all countries except the United States are taught for the first time at this stage—can never be anything but elementary in its presentation. The name of "advanced" geographies has been introduced, to be sure, for no other reason but the necessity, as long as a special text is used for beginners, to distinguish the second book from the "elementary" proper; its meaning is practically "advanced *elementary* geography". If, as it is so greatly to be desired, the text-book disappears entirely from the first beginners' classes, the need for this distinction will also disappear, and the text-book for the grades may take the name which I intend to use during this discussion, the name of plain "Elementary Geography."

The phase being still elementary, it goes without saying that even with this text the lesson should be mainly oral, consisting of talks between teacher and class that are based on the map, on pictures, on field-work, but not on the text, which should never be before the eyes of the children during the lesson. For the text, on this stage, should not be a source of information. Its duty is quite secondary and auxiliary. It embodies nothing but the pure results of the oral lesson, a brief elementary summary of the work to help the child remember what must be remembered for later studies, combined with such maps, pictures, and review questions that he may be able, with the aid of this book, to go over the same ground again at any time if the subject should have escaped from his memory. Here ends the task of the text in the elementary school which is not to be used as a mine out of which the child has to dig his information, but rather as a mirror that reflects the outlines of the course. The digging, in this stage, is the work of the teacher, and he can only begin to train the child by setting him at little tasks here and there, to learn how to do so for himself in the future.

For this training, however, the material should not be furnished by the text, but by collateral reading pursued in close connection with the lessons. Each child should be assigned in his turn a chapter from some good geographical reader for home study and have to report on it in the class room. The matter will be selected for this purpose so that the

assigned paragraph has a direct bearing on the subject of the class work and, as much as possible, coincides with some special interest of the child. As a rule, every chapter should be assigned to one child only, because this is the only way to prevent the practice only too well known to all of us that one bright child does the work and the others borrow from him. As no more than two or three such reports can be heard in one period, the turn of the individual child will not come so often that this extra work is felt as a burden. The teacher will then say: "Now let us hear what N. has read about. . . ," and first let the child say all he can, while the class listens. When he is through, the others may ask questions on the subject, explanatory and complementary, and by leading the discussion skillfully the teacher can bring out all the important points of the subject, whether duly mentioned by the pupil or not, and correct any misunderstandings that may have happened, or any errors that disfigure the report.

The first steps in this new field need, of course, the most careful attention on the part of the teacher. The beginnings must be made in the classroom, and by the whole class. Let one of the children read a paragraph from the matter selected with good articulation and perfect phrasing, and then ask questions on the subject and on what the paragraph says especially on this subject, entering gradually into the details of the where's, and the how's, and the why's, until all the sides of the matter have received proper elucidation. Side-questions of the pupils will come in by themselves. When the teacher thinks that the subject has been fully mastered he may ask one child to repeat the whole in his own words, then deal with another paragraph accordingly, and so forth during a number of lessons. By and by the treatment undergoes a slight change; the teacher may say before the reading: "Now we are going to hear what a man who has visited that country tells about it, he speaks of . . . , and of . . . , and of . . . , etc.," hereby directing the children from the beginning to pay attention to certain topics. The topics may also be written on the blackboard and after the reading the teacher examines the children to see what they can say about each of them. In this way they will be gradually accustomed to look at their reading from a topical point of view, instead of only reading, reading, reading, as especially bright children are so apt to do, and retaining nothing but a vague notion of having read something on the subject.

Later in the year, the experiment may be tried of saying: "To-day I will see how many of you can find, without my help, an answer to these questions (written on the blackboard) in paragraph so and so," and let

them read silently, showing by the raising of hands when they are through and can report. Finally he will make them understand what a saving of time it would be if just one or two of them studied a paragraph every day and then reported on the same in class, choosing, of course, first the brighter pupils for this work and later on the slower ones. These first independent readings are still governed by written questions (or printed questions, if the reader is supplied with any that are good) proceeding gradually from easy, mere matter-of-fact questions to the kind that require some thinking. At the end, topics alone are given, until at the beginning of the next year the children are able to deal intelligently with printed information, even without detailed help from the teacher. From the second year (sixth school year) up the teacher will be able to assign paragraphs for home study by just pointing out the main topics and letting the children find out themselves the sub-topics and side-topics. From that time on, the grading of the difficulties will lie mainly in the quality of the reading itself, which begins with paragraphs very easy in form and contents, and rises to others more complicated in one or the other respect, until in the last year the children may be given parts of original works of voyage and travel, the classical writings of the great discoverers. It goes without saying that through all the course the teacher should be at any time accessible to the students for personal questions on this work, but on all these occasions he must remember that he can develop the power of the child only by directing him how to solve the puzzle, not by solving it for him.

I know very well that work of this kind is being carried on in many places as text-book study; therefore I want it to be clearly understood that I am speaking, not of the text-book, but of supplementary reading. Why? Because by studying from a text however carefully it be done, the young mind gets the impression that geography is a knowledge that can be learned from books. This is why the course in elementary geography should never be based on a text, however excellent it may be, but on observation and oral instruction. (To do this, of course, we need teachers who can do this kind of work,—and their number is not large, I admit it—but my feeling is that, if we want to improve the school at all, we must set up the requirements for teachers according to the needs of the work, not shape the work according to the limitations of the teachers.) It is from the object, the picture, the map, that the elementary student, both primary and grammar, should gain his knowledge through the intermediacy of the teacher, and only the teacher. From every lesson he should take home a complete mental picture of

the subject treated, and he should look at the text-book only as a kind of helpful friend on which he may rely when his memory shall fall short.

A text-book of this kind will, then, practically take the place which hitherto has been generally held by the notebook, the use of which in elementary teaching I do not hesitate to denounce as out of place. Considering the pure mechanical difficulties of written reproduction for a child of that age, it seems an enormous waste of energy to make him write, in his imperfect way, what others can write and have written ten times better, and what can be procured for him at trifling expense; to say nothing of the temptation of drawing on forbidden sources when the burden becomes too heavy. Then think of the disastrous influence which such an unlimited "production" must have on the training in language! If a child who has hardly mastered the first difficulties of English spelling and grammar is obliged to write such quantities of composition as the keeping of a notebook requires, the quality of the work cannot but be inferior. I am perfectly sure that the greater part of the complaints about unsatisfactory results of English teaching would disappear if we could do away with the notebook fad, which simply obliges children to make mistakes, to acquire the habit of making mistakes, and what is worse, to think lightly of making mistakes because, the subject being geography, they do not count! Nothing of this kind should be tolerated in elementary education. A child of this age must write nothing at which he has not spent his highest effort for form and subject alike, true careful English composition, under the supervision of the teacher of English. But the teacher of geography, what can he do? Shall he shut his eyes against slipshod sentences and bad spelling? If he is conscientious, he cannot. Shall he mark the mistakes? But if they are marked, they ought to be corrected also. Thus the end would be that the whole thing must be done twice, first for correction and then to be handed in neatly copied. Poor children! poorer teachers! How much more knowledge of the real thing could the former acquire in the time spent in this way, how much time for improving their education, their methods, their health, the latter! Let us use text-books as we have hitherto used notebooks, and supplementary reading as we did text-books. Then it will be seen that both English and geography will gain from it.*

*If it is not too much quoting of foreign conditions I should like to add that this has been the attitude towards text-books in Germany for years and years. That is the reason why German text-books so often appear dull and dry; but the books must be judged from the standpoint of the purpose for which they were written. These books are not "text-books" in the American meaning of the word:

Then would, perhaps, disappear also that unnatural dualism in geographic teaching which distinguishes between "text-book" and "laboratory work." Not text-book *and* laboratory, not sometimes book study and sometimes study of facts, but text-book *in, through* and *by* laboratory work, and laboratory within and with the text-book. Geography is one, it is not partly a bookish and partly an experimental study. Men have observed, and what they saw they have written down in books; we observe, and what is not accessible to our direct observation we try to find out by the records of theirs. But we consult it only in this understanding, as a record of what has been seen and observed, and what we might observe ourselves if we were in their place; we look through their glasses to see what we cannot see with our eyes, but we do not mistake their glasses for the real thing. All bookwork, in geography, is mental laboratory work, or it is not worth anything. The substitution for the old "man *and* nature" of "man *in* nature" can encourage us to hope that in a future not too remote this "text-book *plus* laboratory" idea will in its turn undergo a similar modification.

While in elementary work the teacher stands predominant over the text, the two must, in scientific geography, take their equal shares in the instruction. A scientific text-book is expected to furnish complete information on all the important problems of geography, and

they represent, in fact, nothing but printed notebooks containing a short digest of the subject, a few pictures (the main part of the picture study is done in the class room from large colored pictures of types, about two by three feet in size), a few sketch-maps (the regular maps are bound together separately in a small school atlas) and diagrams, but little or nothing of descriptive text, nothing that we would say "appeals to the child." That which appeals to the child is exclusively the work of the teacher who supplies the vivid picture in the oral lesson, framed according to his own ideal of teaching, which makes it naturally more real than the best printed information could. A text-book like the good American ones would never be successful in the German market, because the teachers would resent its introduction as a limitation of their pedagogic liberty. The less of a text, the better, is the feeling of the German teacher, and if for reasons of convenience and examinations one cannot help having one, it must be strictly limited to that which is anyway the same for everybody, namely, the mere matter-of-fact part, about which the teacher may, with perfect freedom, build up his own individual course. For nothing in the world would the German teacher give up this privilege; not for the sake of the subject, and not for his own sake, because he would feel that the child could not respect him any longer if he stood before him, not as the apostle of the gospel of education, but as a hired interpreter of printer's ink. A teacher who would be found out by a German child to tell him things that "stand in the book" would immediately lose his authority with the children—because they feel that they also can repeat what they have read in a book. No better expression of the different attitude toward the text in the two countries can be imagined than that given by the names of the books: the American speaks of "elementary text-books," the German calls his elementary books almost exclusively "Leitfaden" (leading thread).

while a good elementary teacher must be able to dispense with a text-book, the scientific teacher cannot. For the very essence of scientific work is the looking out for one's self for correct information, the study of all the sources available, printed or observational, in order to find out the truth. The building up and the rounding out of the geographic system stands now in the foreground of interest; every topic is treated from the point of view of its relation to the system; the single objects are studied no longer as geographic individuals, but as specimens belonging to some definite species, and by limiting the names to specified types of certain qualities, the intricate construction of scientific terminology is built up. Even here, however, in order to prevent the student from mistaking the scientific conception of geography for a mere arrangement of technical terms, cross-sections, so to speak, should frequently be made through the subject, that it may be seen how the various factors combine in shaping the character of a certain spot, how they bear upon each other and on that spot, and make it a well defined geographic individual. In other words, besides the systematic treatment of the subject, regional or areal geography (Länder kunde) occupies a place in scientific as well as in elementary teaching. The radically different methods of treating these questions will perhaps give the student even a better understanding of what constitutes the spirit of scientific geography than the mere working out of the system, in which he has nothing to compare with from his former experience. If his scientific studies are confined to the latter, there is a danger that he may see the difference between the two as a mere difference of the subjects treated, and mistake the essence of the scientific geography for a pure abstraction from general geography. Only such exercises as these mentioned above can bring the experience home to him that both elementary and scientific geography may deal with the same subjects and yet be essentially different on account of the difference of method. Then only will the student be able to get an appreciation of the true spirit of scientific geography.

It is not necessary that the text-book include scientific regional geography; on the contrary, these exercises will be much more instructive if the students, with the text-books as a mere systematic guide, put together themselves the individual traits from which the "ensemble" of the scientific treatment of a region is composed, perhaps preparing them as papers for a geographic seminar or for a bachelor's or master's degree. In this way we may obtain, what is so much needed in this country, namely, a good supply of scientifically correct monographs of small sections of the country, from which in later years monographs

of the states may be compiled, for the benefit of the general public, who ought to know their own states better than they can from a school geography, as well as for that of the teachers who at present are often enough expected to teach home geography without one handy and reliable guide that may serve them as a basis for the introduction to the special study of the region. The addition of bibliographical references would be essential for this purpose.

(*This article will be continued in the September issue of The Journal of Geography.*)

GEOGRAPHICAL NOTES

The Forests of Canada.—The composition and present condition of the timber areas of Canada are not generally understood by the people of the United States. We are too much inclined to look upon them as one unbroken forest rather than as separate and distinct areas, and erroneously associate with these different areas the best timber known to have their habitat in this northern country.

A general idea of the composition of the Dominion forests may be formed by ignoring the minor belts of timber and the isolated forest reserves, and dividing the main forest lands into three great belts or divisions. This, of course, necessitates leaving out of the report the forests of the maritime Provinces, which are extensive and valuable, covering about one-tenth of the area of those of Ontario and Quebec; but the forests of New Brunswick and Nova Scotia may be compared in a general way to those of Maine.

By the division suggested, we have three great timber belts in the Dominion—the northern or spruce belt, the southern or commercial belt—both east of the Rocky Mountains—and the British Columbia belt west of the Rocky Mountains. In point of value for general purposes the western or British Columbia belt is far superior to either of the eastern areas mentioned, for the reason that the climate, tempered as it is by the warm waters of the Pacific Ocean, promotes a more perfect growth and development of the different species. Here is found not only the valuable red fir or Oregon pine, generally distributed throughout the entire Province along the coast and on the mountains, but also the red cedar, the western spruce, the yellow cedar, the hemlock, the balsam fir, the western white pine, the western yellow pine, the maple, and the western oak, in such quantities as to make this, perhaps, the most valuable timber belt on the North

American continent. This belt extends from the forty-ninth parallel north to the sixtieth parallel, a distance of some 770 miles, and is from 200 to 300 miles wide. The best timber does not extend to the extreme north. That portion is covered with black and white spruce and constitutes a very extensive pulp-wood range.

Dr. Dawson, in describing the red fir, or Oregon pine, says:

> The best grown specimens are found near the coast, in proximity to the waters of the many bays and inlets which indent it. Here, the tree frequently surpasses 8 feet in diameter, at a considerable height above the ground, and reaches a height of from 200 to 300 feet, forming prodigious and dark forests. The timber is used for housebuilding, shipbuilding, wharves, piles, masts, furniture, fencing, etc.

Next in importance to the Oregon pine is the red cedar. Mr. J. R. Anderson, deputy minister of agriculture for the Province, says:

> The tree is very generally distributed in Vancouver Island and on the coast of the mainland to the westward of the coast range. Scarce in the dry central plateau, it again occurs in considerable quantities in the Selkirk and gold ranges of the mountains.
>
> As in the case of the Douglas, or red fir, the finest specimens are to be obtained in proximity to the seacoast. Here, the tree attains an immense size, an idea of which may be formed from the fact that some of the native canoes—which are all hewn out of the trunks—are 6 feet and more from the level of the gunwale to the bottom.
>
> Although second in importance, as regards its economic value, it is a more valuable wood than the Oregon pine, being used principally for interior finishing, cabinet making, doors, shingles, and posts.

But this region, by reason of its great distance from the markets in the East and the lack of cheap transportation, will remain comparatively in its primeval state until the eastern forests, which are more accessible, are nearly exhausted, or until better transport facilities are afforded.

The northern belt is, perhaps, greater in extent than all the other timber belts and reserves of Canada combined. According to the best authority, it extends from the eastern coast of Labrador north of the fiftieth parallel in a northwesterly direction to Alaska, a distance of some 3,000 miles, with an average width of perhaps 500 miles. This vast strip of timber land, if placed upon the territory of the United States, would extend from Maine to California and from the southern shore of Lake Erie to the northern boundary line of Georgia. It is known as the spruce forest of the Dominion, the great bulk of the timber being of that species—black and white; the other important trees being larch and poplar.

Although this region has been but partially explored, it is claimed

that many of the trees in the southern portion are of a lumber-producing size, but the greater portion is fit only for pulp.

When it is considered that spruce is distributed in vast quantities through all the forests of Canada, and that an almost incalculable amount will be produced in this great northern belt, it is hardly exaggeration to say that the Dominion possesses an inexhaustible supply of pulp wood.

Dr. Bell, of the geological survey of Canada, says of the forest:

> In our northern or spruce forests, a bird's-eye view of the country would show a patchy appearance, due to the fact that these different areas have been burnt over at different times.
>
> The white spruce attains its full growth in about one hundred and fifty years, and there are second-growth patches of this tree of all sizes and all ages, up to one hundred years or more, together with some of the old forest. Spruce trees grow much more rapidly up to about thirty years than they do afterwards. The addition made between thirty and one hundred years is much slower.

In describing its area, he says:

> The area of our northern forests may be reckoned as forty-four times as great as that of England. Any one of these forty-four parts will produce wood enough to supply the ordinary demands of the present population of Canada—that is, 5,000,000 people could get what is required for mining, fuel, etc., by taking the timber from a space the size of England—and would be able to allow the other forty-three equal parts to be in reserve or used for export.

The great region, which has remained so long unexplored, is about to be brought within the reach of civilization through the railway being built from Sault Ste. Marie to Hudson Bay. This will make available at least the timber growing around the bay and along the line of the road, and may possibly provide a more accessible field of pulp wood than can be obtained in any other way for the rapidly growing industries of the Soo.

The southern or commercial timber belt spreads over a very wide territory. It comprises that portion of Ontario and Quebec lying between the forty-fifth and fiftieth parallels of latitude, and bounded on the east by the St. Lawrence River and on the west by the Great Lakes and Manitoba. Great interest centers in this great timber region by reason of its proximity to the manufacturing centers of the United States and because it contains the most valuable timber for lumber east of the Rocky Mountains.

It is not, however, a compact and unbroken belt of first-class timber. Climatic conditions seriously interfere with the development and growth of some of the best species of timber that inhabit this region, for none of the best ones extend farther north than the

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water-shed between Hudson Bay and the Great Lakes, approximately the fiftieth parallel of latitude, and many of them find their northern limit far south of this parallel. Besides, all timber deteriorates in value and becomes less in volume as it approaches the limit of climatic growth. The compositon and extent of this timber belt can be better understood by taking a map of the Dominion and tracing its boundaries and noting the northern limit of the most valuable species. The forty-fifth parallel, which is approximately the southern limit of this region, cuts out entirely one very valuable species—the black walnut—whose northern limit of growth is the latitude of the city of Toronto, while a few miles north of this parallel is the northern limit of red cedar and white oak. A line drawn from the city of Quebec to Sault Ste. Marie will designate the northern limit of beech, while a line drawn from the northern part of New Brunswick to the north shore of Lake Superior will mark the northern boundary of sugar hard maple. Two other valuable species which have their northern limit within this belt are elm and birch.

The king of the northern forests is white pine, which has its northern limit, as have also white cedar and red pine, at the fiftieth parallel of latitude. This region is now virtually its only home in the Dominion of Canada. It was at one time supposed that it had a very extensive northern range, but Dr. Bell states that its distribution is comparatively southern, very little, if any, being found north of the fiftieth parallel, which marks the watershed between Hudson Bay and the Great Lakes. This belt would furnish an enormous supply of excellent timber but for the destruction wrought by forest fires. Dr. Bell calculates that about one-third of this territory may be considered as under a second growth up to about 10 years of age, one-third as intermediate, one-third including trees of 100 years or more, and this applies doubtless to all the forest areas of Canada; but as to this particular belt, which lies at the very doors of the great manufacturing establishments of the United States, and is the one foreign timber region, upon which we rely, one must admit that the available supply of first-quality timber is alarmingly limited.

The Canadian forests have never been called upon to pay the enormous tribute to multiplying industries that our forests have; but they have been decimated by the speculative lumberman and the improvident settler, and ravaged by fire until those which are most accessible bear little resemblance to their prime valstate.—*Consular Reports*, January, 1903.

The Ascent of Mt. Everest.—A serious attempt is about to be made, writes Herbert C. Fyfe in the *Scientific American*, to ascend the highest mountain in the world, Mt. Everest, which rears its stately head 29,002 feet above the level of the sea.

The highest point to which man has so far climbed is 22,860 feet. This is the height of Aconcagua, the loftiest summit of the main cordillera of the Andes. Aconcagua was scaled by the famous guide, Mathias Zurbrigger, and Mr. Vines, two members of the expedition sent out by the Royal Geographical Society in 1897 under Mr. E. A. Fitzgerald, who himself failed to reach the summit. Before this event the record was held by Sir William Martin Conway's expedition, which in 1892 climbed a mountain in the Karakoram Himalayas 22,600 feet high. Mr. W. Graham in 1883 claimed to have ascended Kabru (24,015 feet), but his claim is generally disallowed. The new expedition, which has just started for the Himalayas, is under the direction of Mr. Eckstein. Very few details regarding the plan of operations can be ascertained, but it is known that Mr. Eckstein and his companions have set before themselves the task of ascending to the loftiest peak of the two highest mountains not only in the Himalayas, but also in the world, Mt. Everest (29,002 feet) and "K 2" (28,250 feet).

There is nothing impossible in scaling Mt. Everest. Two things are wanted, time and money; and provided these are forthcoming, success may very well be looked for.

Most of the great climbers of to-day agree in affirming that man could exist at an altitude of 29,000 feet, provided of course that careful precautions were taken and that all the details of the expedition were worked out in a thoroughly practical manner. The climber must not attempt to ascend Mt. Everest right off. He will have to take some years over it, climbing each year to a certain height and resting weeks here and there on the road in order to accustom his body to the unwonted altitudes. Supplies will be a great problem, but if he can manage to insure food, clothing, and other necessaries reaching him at the various camps at which he will be forced to remain for some little time, and if he is strong enough to withstand the cold and the rarefied atmosphere, it is possible that one day his ambition will be satisfied and that he will be able to take his stand on the highest point of the earth's surface and to rejoice in the fact that he has accomplished something which no one else has ever done since the world began.—*National Geographic Magazine*, Vol. XIV., No. 4, April, 1903.

Progress of the United States — 1800-1900.

		1800	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900
Area(a)	sq. miles	827,844	1,999,775	2,059,043	2,059,043	2,059,043	2,980,959	3,025,600	3,025,600	3,025,600	3,025,600	3,025,600
Population		5,308,483	7,239,881	9,658,453	12,866,020	17,069,453	23,191,876	31,443,321	38,558,371	50,155,783	62,622,250	76,303,387
Farm products, value	$	.....	.....	.....	.....	.....	.....	.....	1,958,030,927	2,212,540,927	2,460,107,454	3,764,177,706
Manufacturing establishm'ts	No.	.....	.....	.....	.....	.....	123,025	140,433	252,148	253,852	355,415	512,734
Manufactures in U. S., value	$	.....	.....	.....	.....	.....	1,019,106,616	1,885,861,676	4,232,325,442	5,369,579,191	9,372,437,283	13,039,279,566
Imports of merchandise	$	91,252,768	85,400,000	74,450,000	62,720 956	98,258,706	173,509,526	353,616,119	435,958,408	667,954,746	789,310,409	849,941,184
Exports of merchandise	$	70,971,780	66,757,970	69,691,669	71,670,735	123,668,932	144,375,726	333,576,057	392,771,768	835,638,658	857,828,684	1,394,483,082
Imports—Silk, raw	lbs.	.....	.....	.....	.....	.....	.....	.....	583,589	2,562,236	7,347,909	13,043,714
Rubber, crude	lbs.	.....	.....	.....	.....	.....	.....	.....	9,624,098	16,826,099	33,842,374	49,377,138
Tin plates	lbs.	.....	.....	.....	.....	.....	.....	.....	150,932,768	379,902,880	680,060,925	147,963,804
Iron, steel and manufactures	$	.....	.....	.....	6,346,237	8,192,093	17,665,398	21,526,594	32,655,454	53,714,008	41,679,591	20,478,728
Exports—Iron, steel and manufactures	$	.....	139,000	57,000	309,473	1,104,455	1,911,320	5,703,024	11,002,902	12,605,576	25,542,208	121,913,548
Agricultural products	$	.....	33,502,000	41,657,673	46,977,332	92,548,067	108,605,713	256,560,972	361,188,483	685,961,091	629,820,808	835,858,123
Manufactures	$	.....	3,897,570	3,891,869	6,641,016	11,149,621	17,580,456	40,345,982	68,279,764	102,856,015	151,102,376	433,851,756
Farm animals, total value	$	.....	.....	.....	.....	.....	544,180,516	1,089,329,915	1,822,328,377	1,576,917,556	2,418,766,028	(b)2,981,054,115
Production, of gold	$	.....	(c)2,463	(c)73,112	(c)564,90	(c)11,697,829	50,000,000	46,000,000	50,000,000	36,000,000	32,845,000	79,171,000
Silver	$	.....	.....	.....	.....	.....	50,000	150,000	16,000,000	39,200,000	70,465,000	74,533,495
Coal	tons	.....	.....	(d)365	197,734	864,379	3,358,899	18,513,123	32,863,000	63,822,830	140,866,931	240,965,917
Petroleum	galls.	.....	.....	.....	.....	.....	.....	(e)21,000,000	220,951,290	1,104,017,166	1,924,552,224	2,661,233,568
Pig iron	tons	.....	.....	20,000	165,000	286,903	563,755	821,223	1,665,179	3,835,191	9,202,703	13,789,242
Steel	tons	.....	.....	.....	.....	.....	.....	.....	68,750	1,247,335	4,277,071	10,188,329
Copper	tons	.....	.....	.....	.....	(f)100	650	7,200	12,600	27,000	115,966	270,588
Wool	lbs.	.....	.....	.....	.....	35,802,114	52,516,959	60,264,913	162,000,000	232,500,000	276,000,000	288,636,621
Wheat	bush.	.....	.....	.....	.....	84,823,272	100,485,944	173,104,924	235,884,700	498,549,868	399,262,000	522,229,505
Corn	bush.	.....	.....	.....	.....	377,531,875	592,071,104	838,792,740	1,094,255,000	1,717,434,543	1,489,970,000	2,105,102,516
Cotton	bales	155,556	340,000	606,061	976,845	2,177,835	2,333,718	4,861,292	3,114,592	5,761,252	7,311,322	9,436,416
Sugar	tons	.....	.....	.....	.....	69,246	110,526	190,040	46,800	92,802	136,503	149,229
Sugar consumed	tons	.....	.....	.....	.....	.....	.....	.....	.....	956,784	1,476,377	2,219,847
Cotton exported	lbs.	.....	.....	.....	298,459,102	743,941,061	1,026,602,269	1,767,686,338	958,558,523	1,822,061,114	2,471,799,853	3,100,583,188
Railways in operation	miles	.....	.....	.....	23	2,818	9,021	30,626	52,922	93,262	166,654	194,321
American vessels built	tons	106,261	127,575	51,394	58,560	121,204	279,255	214,798	276,953	157,410	294,122	393,790
Engaged in foreign trade	tons	669,921	984,269	619,048	576,475	899,765	1,585,711	2,546,237	1,516,800	1,352,810	946,695	826,694
Domestic trade	tons	301,919	440,175	660,065	614,508	1,280,999	1,949,743	2,807,631	2,729,707	2,715,224	3,477,802	4,338,145
Commerce of Great Lakes	tons	.....	.....	(g)3,500	11,106	54,199	198,266	467,774	684,704	605,102	1,063,063	1,565,587
Vessels passing through Sault Ste Marie Canal	tonnage	.....	.....	.....	.....	.....	.....	403,657	690,826	1,734,890	8,454,435	22,315,834
Post-offices	No.	903	2,300	4,500	8,450	13,468	18,417	28,498	28,492	42,989	62,401	76,688
Telegraph messages sent	No.	.....	.....	.....	.....	.....	.....	.....	9,157,646	29,215,509	55,878,762	63,167,783
Newspapers and periodicals	No.	.....	(h)359	.....	(i)861	1,403	2,526	4,051	(j)5,871	9,723	16,948	20,806
Patents issued	No.	.....	.....	.....	.....	1,465	6,981	4,778	13,333	13,947	26,292	26,499
Immigrants arrived	No.	.....	.....	(k)8,385	23,322	84,066	310,004	150,237	(l)387,203	457,257	455,302	448,572

(a) Exclusive of Alaska and islands belonging to the United States.
(b) Does not include value of animals in cities, estimated in 1900 at $220,000,000.
(c) Dr. Soetbeer's estimate averaged for the period.
(d) Pennsylvania anthracite shipments, 1820 to 1860; entire coal product 1870 to 1901.
(e) In addition to this it is estimated that 10,000,000 barrels ran to waste in and prior to 1862 for want of a market.
(f) 1845.
(g) Andrew's *Colonial and Lake Trade.*
(h) 1810 to 1860, inclusive, from census of 1880.
(i) 1828.
(j) 1870 to 1900, from Rowell's Newspaper Directory.
(k) 1820 to 1850 total alien passengers arrived year ending September 30.
(l) Years ending June 30 to date.

—*Monthly Summary of Commerce and Finance, February, 1903.*

Irrigation Works of India.—Irrigation has been common in India since an early period of her history, but the fact that she now possesses the most extensive irrigating system in the world is due to the British Government, which has spent from time to time over $150,000,000 on these works.

The works on the Ganges were opened in 1854 by Lord Dalhousie, then Governor-General of India. Since that date, however, they have been vastly enlarged and improved, and now the total length of the main canals and branches is 1,096 miles and the area irrigated 1,605,740 acres.

The Bári Doáb Canal, 363 miles long, irrigates 777,451 acres. The East Jumna and West Jumna canals, 488 miles long, irrigate 946,220 acres. The Sirhind Canal, 319 miles long, irrigates 782,700 acres. The Sone project, which is only partly completed, extends 367 miles and irrigates 440,796 acres. The Chenáb Canal, opened in 1887, when it irrigated only 10,854 acres, now, through a succession of extensions, irrigates 1,500,000 acres, and this area will be increased in the near future to 2,000,000 acres. The total length of its main channel and branches is 429 miles. The Jhelum Canal, recently opened, will irrigate the large tract of arid country lying between the town of that name and the Indus River to the south of the Salt Range. In the Bombay presidency there are several large works which, combined, irrigate 1,968,783 acres.

But the irrigation works in the Madras presidency are on the most colsosal scale. They were projected in 1835 by Sir Anthony Cotton, a hydraulic engineer of great ability. His object was to cover all India with a system of canals which would serve both for irrigation and navigation. If this project had been carried out, the material condition of the country would have been transformed. Among Sir Anthony's great works are those on the Cauvery and Coleroon rivers, in districts of Trichinopoli, Tanjore, and South Arcot. They include the dam, or anicut, which turns the waters of the Upper Coleroon into the Cauvery River on the right and at the same time irrigates abundantly the Trichinopoli district on the left. Among them also is a second and still larger dam, 70 miles lower down the Coleroon, which, again intercepting the water, much of which percolates through the deep sands of the river bed, distributes it bountifully among the southern taluks of South Arcot. The financial success of the Cauvery Delta Works, which irrigate 934,123 acres, has been marked. The last official return—1900–1901—gives the earnings on the capital invested as 31 per cent, while the increased

value of private property has been equally large. In seasons of scarcity, these districts have not only been free from the horrors of famine, but have also been able to pour large supplies of food into the stricken provinces.

The next great work of Sir Anthony Cotton was the dam across the Godávari River. It is of greater magnitude and presented more engineering difficulties than the dams on the Cauvery and Coleroon. The total width of the river at the point where it was decided to build the dam is rather more than 3 miles. Intercepting islands, however, reduce the length of the dam proper to 2½ miles. The profits from these works are less than those returned by the Cauvery system, as the cost of keeping up the former is considerably greater; but despite this fact, they yield over 15 per cent on the money invested, irrigate 749,612 acres of land, and have converted a region once among the poorest in India into one of the most prosperous.

The Kistna system, built a few years after the Godávari Dam, irrigates 507,354 acres and yields an interest of 15 per cent on the capital expended.

Farther south, on the border of the Madura district and of the native state of Travancore, there has recently been constructed an irrigation work commonly known as the Periyár project, even more ambitious in design and presenting greater difficulties of execution than any yet undertaken in India. It consists of turning eastward the course of the River Periyár, a large stream rising in the Travancore hills, which, flowing northward, has hitherto fruitlessly poured its fertilizing treasure into the Arabian Sea. Now, by means of a great dam, one of the largest in the world, and a tunnel through the Ghats, 1½ miles in length, it has been compelled to mingle with the Vaigai River, and the vast volume of water spreads plenty through the land as far as the Bay of Bengal. When fully completed, the works will irrigate at least 150,000 acres, excellent for the cultivation of rice.

There are many other similar works of considerable magnitude; but those I have mentioned will give an idea of the vast scheme of irrigation that is being carried out in India.

Some of the canals designed first for irrigation are now used more or less for navigation and constitute part of the work of the British Government of opening up communications throughout the country.

The nature of the climate and the inequality of the rainfall have led to the practice of irrigation from time immemorial in India. It is absolutely necessary in Sind and the Punjab, and hardly less so in the

tract lying between the Arávalli and Chilton hills, in the eastern part of the Bombay presidency; also in the greater part of the Nizam's territory and in some districts in Madras, in Mysore, and in the Karnátic. Irrigation is so essential in the eastern districts of Madras, as well as in central India, that without it a failure of the periodical rains would produce most serious results.

Until the country is covered with canals and provided with tanks for the storage of rain water for irrigation purposes, it will be subject to the ever-recurring visitations of famine, which bring disaster, misery, and death to millions of people.

The irrigation works of India are divided into two main classes—major and minor, the former being subdivided into productive and protective works. The most important are those classed as productive works, or works the cost of which has been wholly sustained by loan funds, in expectation that they would prove directly remunerative and that the net revenue derived from them would fully cover all charges for interest within a reasonable time after their completion.

The protective works are those that have been sanctioned in consideration of their value as famine preventives, without any expectation of their becoming directly remunerative; and the cost of their construction has been met from the famine grant. At present, there are five of these works in operation.—*Consular Reports*, March, 1903.

The Use of Snow Ice in Irrigation.—During the past season a special investigation has been in progress in the state of Wyoming under the charge of A. J. Parshall, resident hydrographer for the U. S. Geological Survey, into the effect of ice on the peaks of the Rocky Mountains and its relation to the water supply used during the summer for irrigation. It is yearly becoming more evident that the precipitation which is of the greatest value to irrigators comes in the form of early snows, which falling upon the mountains in areas protected from the sun and wind, gradually become consolidated into banks of ice and remain in this condition until after the flood season in the spring has passed. Warmer days in the late spring gradually melt these ice fields and by means of the flow from them the streams are supplied with a greater amount of water than would be the case if the mountain snows melted earlier in the year. Water from this source is of the greatest value to irrigators as it comes at a time when the crops are in especial need of irrigation.

Investigations into the amount and character of the snowfall during the fall of 1902 were carried on in the state of Wyoming with

the result that the larger part of the snowfall was found to have taken place in the southeastern and northwestern portions of the state, while very little fell in the southeast and northeast. The heavy storms were followed by weather which was moderate during the days but cold at night, a condition which was of the utmost value in packing the snow into heavy banks which were later consolidated into masses of ice to form the storage above referred to.

The streams which derive benefit from this source are the North Platte River and the western drainage of the Laramie Mountains, Snake River and tributaries which water Snake Valley, and the tributaries of the Big Horn, which have their source in the Wood River Mountains. The Big Horn range had less than the usual snowfall as had also the wide strip of country in the west central portion of the state where during late November and December little or no snow had fallen.

This investigation forms part of the study of the country's water supplies which is being undertaken by the U. S. Geological Survey.

REFERENCES ON AFRICA.

Selected from the volumes in the Boston Public Library, Boston, Mass., and annotated by the ***Teachers' Geography Club of Boston.***

NORTH AND EAST AFRICA

The Madeira Islands. By Anthony J. Biddle. *Philadelphia:* Drexel Biddle, 1896.

A small book, written in free lecture style, with a few pictures of people, dress, buildings, carriages, etc.

Page.
Story of the Romantic Discovery of the Islands 21
Character of Islands and Shire 43
Climate 39–57–65–93
Attitude of People toward U. S 47
Description of People 39–41–48–50–51–95
Food 43
Dress 69–83
Customs 51–52–59–65–66–85–94–96
General Business 35–94–95
Agriculture 92
Exports 59
Money 83–84
Government and Population 91
Plants 96
Animals 52–60
Miscellaneous Information as to Steamer Routes, Hotels, etc 101

Egypt in 1898. By G. W. Stevens. *New York:* Dodd, Mead & Co., 1898.

This book is a journal of a trip through Egypt.

Page.
Importance of Port Said as a port 22, 23, 24, 25

Page.

Description of a view of the canal, from a train on its way from Port Said to Suez.....30, 31
Comparison of Port Said and Suez.....42, 43
Description of old-fashioned method of irrigation.....95, 216
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Importance of sugar-growing on the Nile.....167, 168
Importance of Alexandria as a port. *Chap.* 15.....
Scenery on the Nile.....214, 215
Description of ruins of Luxor and Karnak.....228–229–230–231

From The Egyptian Ramleh. By Alexander A. Boddy, F. R. G. S. *London:* Gay & Bird, n. d.

A story of life in Egypt from the standpoint of a traveler and temporary resident. It gives brief glimpses of nearly all sides of life. The following references contain such glimpses:

Page.

Scenes in Cairo streets.....19, 30, 31, 34
Ascent of Pyramids.....25–29
High water of the Nile.....40, 175, 176
Fertile Egypt.....41–42
The desert.....44, 107, 108–112, 234, 240–247
Suez canal.....44–46
In and around Alexandria.....55–62, 65–71, 80–83, 153, 154–156, 159–162, 165
Weather in Egypt.....76, 77, 251
On the Isthmus of Suez.....98
An Oriental dinner.....122
An Arab funeral.....145
Traveling along the Nile.....207–214, 217–220, 275
Railroads in Egypt.....221–225
Value of Date Palms.....257

Present Day Egypt. By Frederic Courtland Penfield. 5½x8¼. Pp. xiii3+729 Illus. 53; Map, 1. *New York:* The Century Co., 1899.

The whole book is exceedingly valuable. Written by the U. S. Consul-General to Egypt, 1893-1897, it gives the views of one who is in a position to know thoroughly of what he writes. It is written in a masterly way and is well worth the time spent in reading it. The descriptions of Cairo and of Alexandria given in the first three chapters are very interesting and the political situation of Egypt is well presented. The headings of the chapters given in full below will show the scope of the book.

Chapter.

In fascinating Cairo.....I, II
Alexandria, seat of Egyptian Commerce.....III
Paradoxical but effective administration.....IV
The expansion of productive Egypt by irrigation.....V
The story of the Suez canal.....VI
Ismail Pasha as khedive and exile.....VII
Tewfik Pasha and the Arabi rebellion.....VIII

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Chapter.
The present khedive and his family.....IX
Great Britain's position in Egypt.....X
Wintering in Egypt for health's sake.....XI

The Great Rift Valley. By J. W. Gregory. *London:* John Murray, 1896.

This book treats of British East Africa and is of great value as to the geology and the physical geography as well as the plants and animals of the country. The introduction first presents the view formerly held that Africa was exceedingly simple both as to geological and geographical formation, and had scarcely changed since very ancient time. It then contrasts this theory with the one necessary to account for the recently formed rift valleys of East Africa and the accompanying earth-movements in that region and the great changes in vast river systems and lakes. Chapter XII deals with the geology and the physical geography of British East Africa and chapter XIII with the distribution of plants and animals. These three chapters could hardly fail to give a very clear idea of the country. The illustrations are good and the maps instructive.

In addition, the following pages are interesting:

Page.
The formation of water-holes.....66
Description of a lake in rift valley.....110
Lake Baringo in rift valley.....132, 135, 137
Chapter.
Mt. Kenia.....X
Animals.....XIV
Plants.....XV

Through Jungle and Desert. By William Astor Chandler. *New York:* The Macmillan Co., 1896.

An interesting account of travels and experience in an almost unexplored part of Africa. It recounts many exciting hunting adventures, and contains a good deal of information about the country, the people, and the productions given in connection with personal experiences. There are, however, few places where several successive pages are given up to purely geographic matter.

The following references are all informational but are all brief:

Page.
Natives of East Africa and their customs, 15, 16, 37, 38, 40, 44, 48, 49, 54, 61,69, 90, 100, 101, 105, 145, 156, 157, 158, 160, 184-188. 190-199, 213, 219, 220-222, 239, 242, 245-260, 278, 279, 296-307, 311-323, 353-358, 373-377, 403, 404, 406-408, 413, 414, 445-447, 485, 497.
Character of country, 17, 65, 66, 82, 84, 92, 97, 98, 108-110, 112-116, 124,127-129, 131, 138, 149, 150, 151, 182, 183, 189, 201, 238, 269, 280-283, 378.
Soil and productions.....18, 45, 69, 81, 95, 153, 379
Rivers of region.....38, 39, 58, 63, 69, 82, 273
Game.....82, 83, 84, 85, 86, 92, 96, 111, 129, 141, 147, 379, 385, 389, 391,392, 396
An elephant hunt.....358-373

CENTRAL AFRICA

The Land of the Pigmies. By Guy Burrows. Size, 8¾x5¾. Pp. xxii+299. *New York and Boston:* Thomas Y. Crowell, 1899.

The greater part of this book is devoted to a description of the customs and manner of living of the tribes of natives in the vicinity of the Congo River. The author had spent much time in the country near the Welle' river, a branch of the

upper Congo, thus obtaining a knowledge of tribes generally but little known to white men. The book should be read by adults, not by boys and girls. It is profusely illustrated and the illustrations are good and instructive.

In Chapter VIII, the pigmies are described. It is an interesting account of the habits and life of this dwarf race from whom the book takes its name. Chapters X, XI and XII are given to the government of the Congo Free State, its animals, its plants and its railway.

Other valuable pages are the following:

	Page.
Introductory remarks by Stanley	XII to XVIII
Preface	XIX to XXII
Letter from king of Belgians	Appendix
People of Lower Congo	8–15
Tornado	31–32
District of Upper Welle'	53–57
Azande tribe	57–76
Mangbettou tribe	92–103
Country south of Welle', underground rivers, etc	126–128
Method of making beer	135
Elephants	159–166
Mobanghi tribe	210–216

In Dwarf Land. By A. B. Lloyd. Size, 8½x5¾. Pp. xxiv+385; Illus. and maps, 146. *London:* T. Fisher Unwin, 1889.

The pages relating to the dwarfs or pigmies will be found toward the latter part of the volume, pages 307 to 316 and 321 to 324. The book is devoted to a description of a journey across Africa from east to west, through Uganda and the Congo Free State and down the Congo River. Considerable time was spent by the author in Uganda. The illustrations are frequent and interesting. I have noted the following:

	Page.
A night in camp	28–29
An African forest at night	39–40
On Victoria Nyanza	103–115
The people of Uganda	125–134
Catching Zebra	135–138
Native Hospitality	155–158
Mountains of the Moon	164
Through unknown country	184–186
Houses in Toro	191–195
Elephant hunting	199–202
Craters	207, 208
Sudden storms	210–214
Simliki valley	218–228
Journey through country west of Toro	277–287
Great forest of Central Africa	297–307, 319–321
River travel on the Aruwimi, a tributary of the Congo	332–334, 341–343
Forest ivory	339, 340
The Bangwa "telegraphy"	353, 354
By steamer down the Congo	368–372
By railway to Matadi	375–378

Under the African Sun. By W. J. Ansorge. *New York:* Longmans, Green & Co., 1899.

First half of book goes into details of native life from Zanzibar to Lake Albert Nyanza, about 800 miles; Uganda Protectorate, the British colony, being carefully described.

Last half of book describes in an interesting way the hunting of the elephant, rhinoceros, hippopotamus and lion.

Teachers of lower grades could gather interesting facts and stories for pupils, while in the upper grades, pupils would be able to read for themselves and enjoy what was read.

The book is in great need of a map of the locality described.

Pioneering on the Congo. By W. Holman Bentley. 2 vols. Size, 8½x5½. Pp. 478 +428; Illus. 206+one map. *New York:* Fleming H. Revell & Co., 1900.

This is a book to be used by the teacher as the geographical information must be gleaned here and there from the story of the pioneer missionary work along the Congo. The following references may be of use to teachers in this search:

Vol. I. *Page.*

Storm at Sierra Leone. 93
Inhabitants of Sierra Leone. 95
"Kru" boys. 95–97
Products of Gold coast. 98–99
Approach to mouth of Congo. 105–107
Town of Banana, at mouth of Congo, in 1878. 69–74
Up the river from Banana to Boma. 108–112
Boma. 112–113
Up the river from Boma to Musuku. 113–115
House building at San Salvador in Congo region. 143–148
Seasons and storms of the Congo. 148–155
Day in San Salvador. 156–160
Native blacksmith. 183, 184
Arthington Falls on the Congo. 193–195
A native cotton weaver. 198, 199
Jungle fires. 213–215
History of Congo basin. 219–223
Six great races of Africa. 223–229
Remains of ancient plateau, near the Congo. 301
Cataracts in the Congo. 304–305
Falls in the Congo. 306–307
Bed of the Congo. 307–308
Traveling in vicinity of the Congo. 311–317
Stanley Pool. 342–344
Rapids of the Congo. 362–364
Fishing for white bait. 391–392
Native markets. 400–402
Traveling on the Congo. 405–406, 413–414, 423–426

Vol. II.

Occupations of natives. 36–37
Elephants and their ravages. 45–46

Page.
Trips on the upper Congo....49–55, 67–68
Divisions of Africa among the European powers (1884)....78–84
Exploring branch of upper Congo....137–138
The Bobangi....167–168
Wathen plateau....197–198
Settling boundaries of Congo Free State....222–224
Stanley Falls....288–289
Railway....316–317
Wathen....321–324
Government of Congo Free State....Chapter VII

In Lionland. By M. Douglas. *London, Edinburgh and New York:* Thomas Nelson & Sons, 1900.

The story of Livingston and Stanley for juvenile readers, which might be used as a reference book for the younger pupils, but the geographical information must be gleaned from very brief references, such as the following:

Page.
Kalahari Desert....14–18..
The Zambezi and its branches....26, 55, 68–93
Native villages....35, 36
Effects of rainy season....37, 48, 101, 103, 169–171, 181–183, 187
Habits of natives....50, 59, 61
Victoria Falls....57, 58
Lake Tanganyika....109, 110, 116, 117, 158–161, 168

SOUTH AFRICA

Impressions of South Africa. By James Bryce. *New York:* The Century Co., 1900.

A book which well repays careful reading, and which treats the subject fully and satisfactorily. It is of special interest to the student or teacher of Physical Geography because throughout the book the subject of geographic control is clearly brought out. Chapters which deal most directly with the geography of the country are as follows:

Chapter I describes the physical features of the country, emphasizing the dominant physical facts, while Chapter V describes the physical features of each political division.

Chapter II treats of the geographic conditions which make for health.

Chapter III gives an account of the animal life, and Chapter IV of the plant life.

Chapter V traces the connection between the nature of the country and its history.

Chapter VIII gives an account of the native people. Chapters XV, XVI and XVII contain each an account of travel through the inland regions of South Africa, in which physical features of the country, people, occupations, resources and history are briefly treated.

In Chapter XXVI the natural resources of the whole country are summed up, and a prophecy of the future value of each class of products is given.

The Key to South Africa: Delagoa Bay. By Montague George Jessett. *London:* T. Fisher Unwin, 1899.

This book gives many important and interesting facts regarding the region near Delagoa Bay. It is a book to be best handled by mature persons, as it deals to a large extent with figures by way of explanation.

For good description of harbor and city of Lourenço Marques, also commercial life, see Chapters II and III.

	Page.
Natives	90–96
Animals	96–101
Plant Life	101–108

Chapter VII. Shows the important part this section played in the late war in the Transvaal; Mr. Rhodes opinion upon this land; also remarks by Mr. Chamberlain.

On the South African Frontier. By William Harvey Brown. *New York:* Charles Scribner's Sons, 1899.

An account of the adventures and observations of an American in Mashonaland and Matabeleland.

A book which is largely given up to personal experiences and to a brief history of the troubles consequent upon the settlement of a new country. Information about the country of interest to the teacher is given somewhat incidentally.

The following references give such information in brief:

	Page.
Character of country, vegetation, industries around St. Paul de Loanda	12, 13, 19
Cape Town and its surroundings	40–43
Diamond mines at Kimberley	52, 53
Cape Town to Mafeking, appearance of country, people, towns	59–61
Mafeking to Tuli river, country, people, animals	69, 70, 75, 76
Animals of Mashonaland	114, 115, 121, 135, 170, 171, 277–281
Domestic life of natives	190–206, 208–221, 282
Conditions on eastern coast	300–302
Health conditions, soil, productions and climate of Rhodesia	308–313

The Kingdom of the Barotsi, Upper Zambezia. By Alfred Betrand. *London:* T. Fisher Unwin, 1899.

A book which is interesting to read and which contains a good deal of information about the people and country around the upper Zambezi.

In Appendix I, pp. 271-288, this information about the people is summarized and in Appendix II, pp. 289-301, an account of the country explored is given in brief.

The following shorter references also give information which would be useful to a teacher desiring to get an idea of life in this part of Africa:

	Page.
Bechuana Land, character of country, government, people, habits and customs	24–36
The edge of the desert, (same topics as above)	41–62
The Barotsi Kingdom:	
People	90–108, 130, 154–156
Climate	112, 120, 126, 128, 143, 199, 202
Nature of country	133
A visit to the king	135–146
Visit to a native queen	148–152
Injurious insects	151
Descending the Zambezi by canoe	159–185
The Victoria Falls	194–197
Life in a pioneer town	211–217
Coaching in South Africa	218–224

Page.
Farming in South Africa. 226–227
Tea culture in Natal. 246–252
Visit to a sugar refinery 254–256
Ostrich farms 262, 263

How Large the World Is.—In Finland to-day, a country that has sent us a considerable number of good immigrants, and that has many claims on the attention of all civilized mankind, there is a famine so appalling as to pass description. For many months news of it was practically suppressed by the Russian censorship. A cold summer ruined the crops, and floods swept away such food supplies as matured. These misfortunes came at a time when the country had lately been disorganized and demoralized by Russian tyranny. One estimate has been made that as many as 400,000 persons are suffering for want of food. The country to whose humanity they would naturally look is Russia, and Russian help in such an emergency is practically no help at all. If Finland lay within the region of the organized helpfulness of western Europe or of the United States, as the Island of Martinique lies, hardly a human being would be allowed to die from starvation. There are then, two modern worlds—one consisting of those countries that are bound together, not by religious belief (for Finland is a Christian country), but by rail and wire—by free institutions and open trade. The other world is made up of those lands and peoples that modern organization has not touched; and they are as far off from us as the "barbarians" were from the Greeks.

Another instance like Finland is Andijan. A few weeks ago an earthquake killed an unknown number of persons (variously reported from 4,000 to 10,000), and a brief, belated despatch to the daily papers is all that the organized part of the world has heard of this distant Turkistan disaster.

As the time approaches when men may communicate by electricity around the globe—possibly without wires—and will trade and travel in lands whose populations are now isolated, it is well to remember that the real forces that bind mankind together are first of all mechanical. It is to swift and cheap travel and communication that we owe the distinguishing qualities of modern life, and not to creeds or formulæ of any kind. And it is pleasant to reflect that the great quality of organization which brings the Filipino into a closer relation with the rest of mankind than the Finn has yet been brought, is the quality that has its freest scope and finds its strongest impulse in our own country.—From *World's Work*, February, 1903.

Relative Humidity in Houses in Winter.—Some observations of the

relative humidity in furnace-heated houses in winter, along lines similar to those referred to in this *Bulletin* for October last, pages 333-334, have been made by Mr. G. A. Loveland, of the United States Weather Bureau, at Lincoln, Neb. In the steam-heated office of the Weather Bureau at Lincoln, during February, 1900, the mean relative humidity was 15%, with an outside air temperature of 19.2°. In December, 1899, and January, 1900, the relative humidities were 18.6% and 21% respectively. The temperature of the room averaged slightly below 70°, and the relative humidity of the air outside averaged 76.2%.

Mr. Loveland also made some observations as to the value of evaporating pans in furnaces or registers as a means of increasing the relative humidity indoors. He found that a pan evaporating two quarts daily is of little or no use in moistening the air. With pans of water in four registers, in a furnace-heated house, and an average evaporation of 5.9 quarts daily, there was an increase of 2.4% in relative humidity.—*Bulletin of the American Geographical Society*, December, 1902.

The Nile Reservoir.—The Assuan Dam has been completed and was formally opened on December 10, 1902. This date will be memorable in Egypt's history, for as long as the Nile continues to flow the great dam will remain as a proof of nineteenth-century enterprise. The boldness of the idea and the thoroughness of the undertaking rank with anything that has ever been done in this land of Titanic achievements. It may indeed be doubted whether any of the great works of Egypt have had so beneficent an effect on this country as will this great engineering triumph.

As Egypt's prosperity depends on agriculture, and agriculture on the Nile, the importance of the new system of irrigation can not be overestimated. Besides increasing the acreage from 12 to 15 per cent., it is expected to double the number of crops each year on land now under cultivation. The effect upon the cotton industry is estimated at 25 per cent. increase.

The dam is one and one-quarter miles in length, is twenty-two feet wide at the top, and has a parapet three feet in height running the whole length. Its maximum width at the bottom is 100 feet and the maximum height 130 feet. The height of the water held up when the reservoir is full will be sixty-seven feet. The capacity of the reservoir is 1,000,000,000 tons. The total weight of the masonry is over 1,000,000 tons. The discharge of the Nile during full flood is 15,000 tons per second, or 54,000,000 tons per hour, when all the sluices are open.

There are 180 sluices, 140 of which are twenty-three feet high by six feet six inches and the balance eleven feet six inches by six feet six inches.

The following are some of the materials used in the work: Over 74,000 tons of Portland cement; 28,000 tons of coal; 114 tons of nitroglycerine explosives, principally gelignite; 790,000 sextuple detonators; 97,000 pounds of blasting powder; 230,000 coils, or 5,520,000 linear feet, of safety fuse; 200 tons of octagon steel for drills and chisels, and 1,750,000 gunny bags.

The huge gauntry, which extended across the main channels, used 72,000 cubic feet of timber in the shape of trestles and longitudinals and 88,500 square feet of two-inch flooring. This flooring had to be stripped off before each flood and relaid the following year for the season's work.

In addition to the various offices, workshops, lime and brick kilns, cement sheds, and magazines, the following buildings were erected: Hospital wards, with dispensaries and residences for the staff of doctors and nurses; large central general-provision store, with bakeries and restaurants and many branches at various parts of the works; a steam flour mill; police station, with quarters for the police; post and telegraph offices, with quarters for the respective staffs; church for the Italian workmen; quarters for about 160 men on contractors' staff, foremen and the English mechanics; quarters for 1,600 Italian stonecutters, masons, etc.; many large shelters for native workmen, and the necessary offices for the Government engineers, inspectors, etc.

The water supply for the works was provided by a great tank excavated out of the solid rock on one of the highest hills on the east bank. This water was obtained by means of steam pumps fixed in the current of the Nile. Mains from this tank were laid all over the works, with services to the houses, baths, etc., each house being fitted with a Berkefeld-pressure filter, which insured pure water for drinking purposes.

The contract for the work was signed February, 1898, and the work was begun the next April. The time specified by the contract was five years, and, although the labor was very considerably increased, owing to the extra depth of foundation, the work has been completed in four years.

The maximum number of men employed at one time was 12,000, of whom 1,000 were Europeans. They worked ten hours daily the year round. The following items give a slight idea of the colossal proportions of the work:

Temporary railways, consisted of twenty-two miles of track and sidings, four feet eight and one-half inches gauge. Most of this had to be taken up and relaid three times, on account of the rise of the Nile and also to suit the works. About three miles of this track (that part between the works and Shellal station) was laid to a mixed gauge in order to deal with

the traffic from the Luxor-Assuan line, over which all the supplies for the work came. That gauge is three feet six inches. There were also six miles of two-foot gauge portable railways and 149 wagons and trolleys for this line.

There were ten locomotives and 394 ballast trucks and stone trolleys of four feet eight and one-half inches gauge. The number of steam cranes was thirty-five, of which twenty-six were four-ton locomotive cranes. The hand cranes numbered forty, of different sizes, up to seven tons. The portable engines numbered nine, from twelve horse-power to sixteen horse-power. There were forty-nine steam pumps of all kinds, from three inches to twelve inches.

The river craft consisted of two steam tugs, one steam launch, five iron lighters and a great number of native feluccas. There was also one brick-making machine, one electric-light plant, a circular saw driven by steam, two sets of diving gear, a telephone installation, two sets of ice-making plants and one soda-water and bottling machine.—*Consular Reports.*

Current Articles on Commerce and Industry:

Cotton, Facts on, *Textile Record*, March.

Forestry and the Railroads (Illus.), *World's Work*, April.

Grain Elevator of Montreal (Illus.), *Scientific American*, March 21.

Iron Ore Handling in the U. S., *Sci. Amer. Suppl.*, March 28.

Italy, Citrus Fruit Crisis, *Bradstreet's*, March 28.

Lemon Growing, American (Illus.), *World's Work*, April.

Lloyds (Illus.), *World's Work*, April.

Manila Hemp in the Philippines, *Mo. Summary of Commerce of the Philippine Is.*, October, 1902.

Mother of Pearl Industry, *Sci. Amer. Suppl.*, March 28.

Olives, Where They Grow (Illus.), *Scientific American*, March 21.

Pine (white) Lumbering Industry, *Bradstreet's*, March 28.

Pineapples, How to Grow (Illus.), *Country Life in America*, April.

Russia, Economic Conditions in 1902, *Bradstreet's*, March 28.

Shipping Combine, The, *Success*, April.

Standard Oil Co., History of (Illus.), Ch. VI, *McClure's*, April.

Tea in Ceylon (Illus.), *Sci. Amer. Suppl.*, March 21.

Venezuelan Asphalt, *Paint, Oil and Drug Review*, March 25.

E. D. J.

In the *American Geologist* for August, 1902, a "List of the Most Important Volcanic Eruptions and Earthquakes in Western Nicaragua within historic Time" is given by Mr. J. Crawford of Managua, Nicaragua. Twenty-two volcanic or seismic disturbances are recorded, generally with brief notes on their extent and severity.

"Geological History of the Charles River in Massachusetts" by Frederick G. Clapp is the title of an interesting and elaborate physiographic study which appeared in the April, 1902, number of the *American Geologist*. (Single copies can be obtained at 35c, from N. H. Winchell, Editor, Minneapolis.) The article is well illustrated by maps, profiles, and views, and cannot fail to prove distinctly valuable to every teacher of physiography.

J. A. D.

EDITORIAL

A SUMMER OF GEOGRAPHY

THE summer vacation offers teachers the best opportunity to improve their knowledge of geography by reading, travel, or study. The various summer schools of the leading universities and normal schools offer the best chances for serious and concentrated study in geography because the equipment of a permanent institution can be used as it would be during the academic year. The JOURNAL notes with particular pleasure the announcement of a Summer School of Geography to be given at Cornell University, Ithaca, N. Y. Hitherto no institution has offered more than a few selected courses in geography in the summer, and the Cornell school presents for the first time an adequate choice of geography courses both in subject-matter and in practical work.

The combination of talent represented in the Faculty of the school is a sufficient guarantee of the value of the work to be presented. The success of the school will be more than a personal compliment to the enthusiastic leader and his colleagues. It will be a proof, better perhaps than any hitherto seen, that the hard work of the leaders in geography teaching within the last decade has borne fruit, and that the country has awakened to the needs and to the value of geography as a serious subject of study in all schools from the elementary years to the college. Inadequate support to the school will, on the other hand, show that

school principals and superintendents still believe geography to be an encyclopedic subject, not even a candidate for scientific classification, that can be trusted with perfect safety to the "end man" of the staff —the person whose time schedule is the least full. Such an outcome would be more than a disappointment: it would be a shame, and we can not believe that the subject has not been evolved from this dark-age condition. We trust, therefore, that teachers will take advantage of their opportunities in an ardent manner, and that the school will be continued each summer hereafter.

It should be said, however, that the recent epidemic at Ithaca has made it necessary for every one desiring to attend the school to make up his own mind as to the safety of so doing. It is probable that a person will be perfectly safe provided he takes care to avoid contaminated water, perhaps more safe than he would be in a region where no thought of contamination existed. It is the wisest policy, however, to be absolutely sure, and every candidate for the school should ascertain the facts before going to Ithaca.

Though attendance upon a summer school is the most satisfactory means of securing geographic training, there are other means which should not be ignored. Excursions and trips to large educational gatherings are of particular benefit to all geography teachers, and should be taken advantage of when possible. The teachers who will attend the meeting of the *National Educational Association* in July will have a chance to see the geography along their route of travel to and from Boston.

Every one contemplating such a trip should prepare himself beforehand by studying the general geographic conditions of the regions to be traversed, that he may understand the glimpses to be seen from his train. A trip into an unknown country may be more relaxing and more inspiring than a summer school, even under a master teacher, and the opportunities for geographic study offered by such a trip should not be ignored.

The next number of the JOURNAL will be largely devoted to the geography of Boston and vicinity in order that teachers may have a guide to the general as well as the special geography of the region, not only for use during their stay in Boston, but before and afterwards. This plan has been arranged because of the geographic education offered by such a chance to see New England, and because the editors believe that all teachers should gain more than relaxation and a change from their attendance upon the Boston meeting.

XUM

REVIEWS

Wanderings in Three Continents. By the late Captain Sir Richard Burton. Size, 8½x5½. Pages xiii+314. Photogravure frontispiece portrait of Captain Burton, and several half-tones by A. D. McCormick. New York: Dodd, Mead & Company, 1902. Price, $3.50 net.

Sir Richard Burton was one of the famous English travelers and explorers of the last generation. He was a prolific writer, his volumes descriptive of travel and exploration numbering over thirty, and in the leisure of consular life he added a literal translation of the "Arabian Nights." In early life he left Oxford for service in the army in India. There he learned half a dozen languages in as many years, and became very familiar with Moslem customs. In 1853 he made himself famous by going, in the guise of a Hindu Mohammedan doctor, on a pilgrimage to Mecca, and giving the world a vivid description of the dangers and discomforts of the trip, and of the rites and ceremonies at the Holy City. In 1854 and again in 1858 he made expeditions under the auspices of the Royal Geographical Society, to tropical Africa, searching for the source of the Nile. In the second expedition he discovered Lake Tanganyika, and Speke, who was in his party, discovered Victoria Nyanza. In 1860 he visited the United States and spent some weeks in Salt Lake City, taking observations on another Holy City, and a rising sect. In 1861 he ascended the peak of the Kamerun, and spent some months at the barbarian court of Dahome. In 1864 he was consul in Brazil, and in 1872 was sent as consul to Trieste, where he ended his days in 1890.

In the current volume, his literary executor has collected eight short sketches, telling, in a brief way, the most striking experiences of his long career; the pilgrimage to the Medina and Mecca, 1853; a ride to Harrar, 1854–55; to the heart of Africa, 1856–59; the City of the Mormons, 1860; a mission to Dahome, 1863; a trip up the Congo, 1863; the interior of Brazil, 1867; and through Syria to Palmyra, 1870.

The sketches are entertainingly written. They have a decided literary flavor, and will make exceptional auxiliary readings. Paper and typography are excellent and the portrait in photogravure is a work of high art. J. P. G.

The Weather and Practical Methods of Forecasting it. By E. B. Dunn. 8vo., pp. viii+356. New York: Dodd, Mead & Company, 1902.

The latest book on meteorology is by Mr. E. B. Dunn, who was for some time Local Forecast Official of the Weather Bureau in New York City. In general plan, *The Weather* is more like General Greely's *American Weather*, published by the same firm in 1888, than it is like any other book on this subject, but Gen. Greely's is the better of the two. The successive chapters, arranged in a more or less conventional order, take up the atmosphere; instruments; pressure, temperature, winds, evaporation and humidity; condensation and precipitation; optical and electrical phenomena; atmospheric disturbances; local disturbances; weather maps; climate, and weather forecasting.

To sum up, in a word, it may be said that the treatment of these subjects is both exceedingly inadequate and very often deplorably inaccurate. The arrangement is unsystematic. The paragraphs and sentences are usually short and awkward.

The book is so full of inaccuracies that it is useless to try to call attention to more than a very few of the errors, but the following passages should certainly be quoted as illustrations of the hopelessly misleading character of much of the discussion. On pages 2 and 3, under the headings "Circulation of Air," we learn that "There is a constant circulation of air flowing from the equator towards the poles in the upper atmosphere, and a counter-current which flows from the poles along the surface of the earth towards the equator." Some pages further on this statement is partially contradicted, when the surface prevailing westerlies are referred to, but there it stands as quoted, grossly inaccurate. On page 24, regarding humidity, we are informed: "Humidity is expressed in two terms, absolute and relative; absolute humidity means the full amount of moisture present at any given time. Relative humidity means the relation of the amount of moisture present to the amount necessary to completely saturate the air," but nothing is said about the temperature at which the air is to be saturated. Further down on the same page we find: "As the atmosphere expands with an increase of heat, its capacity becomes greater for holding moisture," i. e., the capacity seems to depend primarily on the expansion or contraction of the atmosphere. On page 3, and again on page 9, the pressure of the atmosphere on a square inch is given as 1,467 pounds. Will the old difficulty never be overcome which crops up again in the passage (page 57): "The air in passing over a mountain range leaves all the moisture it contains (*condensed by the coolness of elevation*), deposited," etc. The italics are ours. On page 39, "the lowest pressure ever recorded at New York City was 29.83 inches on January 9, 1886" should obviously read 28.83 inches. On page 41 the statement that "between the tropics and the polar circles the sun's rays strike the earth at an angle and glance off" may be set with the one that "the snow limit, as observed on the mountains, is where the highest temperature of the year never sinks below 32°" (page 90). The latter view was shown to be erroneous more than a hundred years ago.

It is unnecessary to multiply these examples. We cannot, however, forbear to quote from page 69, that "The condensation taking place in the atmosphere is attributed to warm moist air arising and mingling with the colder air at higher elevations" (a similar statement occurs on page 121 and page 137), and from page 101, where we learn that "The sky is blue because the momentum of red and orange rays, being greater than that of blue, causes them to penetrate beyond the clouds, but the blue rays are stopped on their passage and reflected."

There is no excuse now for a book to give any other cloud classification than the International (pages 74-76 give a seven type system), whose types have been officially defined and illustrated, nor to omit mention of any theory of storms other than the simple convectional theory. The classification of storms in the United States as "cyclones, anticyclones, hurricanes, tornadoes, thunderstorms and dust whirls," is unique, if not generally recognized. On page 159 we learn that "It is generally believed that storms make a complete circle of the earth."

The chapters on weather maps and on forecasting are somewhat better than the rest. Both of these chapters contain much of interest to any one who is studying the daily weather maps and trying to forecast by means of them. The matter is, however, unsystematically arranged. There are many brief rules, some of them so vaguely general that they are of little value. Cloud prognostics, colors of the sky, and weather proverbs are given considerable space, and in this same chapter on weather forecasting we find a summary of Woeikof's studies on the influence of a

snow cover on climate; a reprint, without any comment, of the Committee of Ten Report on Meteorology, and a paragraph or two on the midnight sun!

There are several illustrations, including seven fair cloud views; cuts of instruments; two rather doubtful views of tornado funnels, four of tornado damage, and several weather maps, etc. In the paragraph on areas of low pressure appears a cross-section of a thunderstorm, from Davis's *Elementary Meteorology* (page 248), with the somewhat remarkable legend: "Storm formation ascending column of warm air."

Such a book can be of no help to teachers or students, and it will only serve to spread still further among the general public many of the erroneous ideas which it is so difficult to correct. R. DeC. W.

Insects Injurious to Staple Crops. By E. Dwight Sanderson. Size 7½x5 inches. Pages x+295. 162 figures in the text. New York: John Wiley & Sons, 1902. Price, $1.50.

Any adequate study of agriculture, or of a staple crop as a natural resource, is incomplete without some attention being given to tests and accidents, which come as negative resources to minimize or cancel the farmer's wealth. But such information as the student would wish on such a point is widely scattered in various authorities, difficult of access, and often in such technical language as to bar the ordinary student from properly assimilating the facts he needs on his subject. His topic might be Indian corn and it would be a very difficult task for him to hunt out in the bulletins of agricultural experiment stations the information he would gladly have as to the corn root worm, corn root louse, corn stalk borer, cut worms, corn ear worms, weevils, meal moths, and the like, with their methods of work, the amount of destruction done by them, and any recourse the farmer may have against them. But he may turn to this volume and find these things told in an interesting manner, and illustrated amply. The same is true for such pests as afflict forage, wheat, clover, cotton, tobacco, potato, sugar beet, and hops.

The book is written as a practical help to intelligent farmers, but it is of equal value to the teacher of commercial geography, and should be in his working library. J. P. G.

The Victoria Regina Atlas. Political, Physical, and Astronomical. Containing 200 plates and complete index. 2d Edition, *Edinburgh and London:* W. & A. K. Johnston, Ltd., 1902. Price 21 shillings.

The World-Wide Atlas of Modern Geography. Political and Physical. Containing 128 plates and complete index. With an introduction by J. Scott Keltie, LLD. 5th Edition, *Edinburgh and London:* W. & A. K. Johnston, 1902. Price, 7s. 6d.

The two atlases, whose full titles are noted above, have many plates in common. The more expensive one contains astronomical, three geological, climate maps, and a number of topographical maps on a large scale.

Both atlases are evidently meant for the public which wishes to know where a place is. The selection of maps is on the whole adequate as far as extra-European regions are concerned and the number of place-names included is as great as can be expected. The United States is shown in twenty-three maps in the large atlas, the section being on scale varying from about 1:2,300,000 to 1:400,000, and India on the latter scale. British colonies also

receive great attention. China is quite inadequately shown on a scale of about 1:20,000,000 in both works, whereas Siam is 1:9,000,000, and so is Asia Minor, which ought to be shown on a larger scale in the larger atlas. A lack of discrimination is exhibited in the selection of maps of European states. The German Empire, France, Spain, Italy and Austria-Hungary are on a scale of 1:5,000,000, but Bosnia, Servia and Roumania are on about twice this scale. In the case of the Victoria Regina Atlas one larger map of Southern Germany is given. In both atlases Corsica is on a scale of 1:1,500,000, and the Balearic Islands 1:2,000,000. One of the useful features of these works is that many islands are on much larger scale than is usual in ordinary atlases. Other useful maps are those which depict a sea and its immediately surrounding lands, e. g. the Caspian (but curiously not one of the North Sea), and the very many insets of town plans and surroundings. It is these features that will lead the teacher to purchase either atlas, for from these he can make many useful blackboard sketches.

The execution of the maps is not all that it should be and as is usual in English atlases, the hill shading leaves much to be desired. The maps, too, have been very carelessly edited and are by no means up to date. The atlases seem to have been compiled by some uncritical person selecting from an ample stock of what were good plates in their day. Who else would have put in two identical maps of Chile in the same atlas (cf. 123-127 World-Wide Atlas, and 193-198 of Victoria Regina Atlas)! Every plate practically requires most careful critical inspection and revision. The Chilian Andes, the Canadian Rockies, the contours of the Pacific, and many other features have not been brought up to date. Siberian, Manchurian and Central Asian railways are not shown nearly so far as they are open. The spelling requires revision, and such blunders as printing Bengal Presidency across the Punjab needs rectification, as the ordinary reader is looking for present political and not military divisions. To permit so many mistakes and to issue incompletely revised maps in 1902 is unworthy of the reputation of W. & A. K. Johnston.

The *World-Wide Atlas* is prefixed by a useful summary of discovery and political territorial changes in the XIX century by Dr. Keltie, who expressly states that he is not responsible for the rest of the Atlas.

A. J. H.

RECENT PUBLICATIONS

Bulletins of the United States Geological Survey:

New York City Folio, Geologic Atlas of the United States, being No. 83. Price, 50 cents.

Contains descriptive text, topographic and geologic maps of New York City and immediate vicinity. The descriptive text includes accounts of General Geography, the Geology (with special emphasis on glacial phenomena), the Physiographic Features and the Water Supply.

Chicago Folio, Geologic Atlas of the United States, being No. 81. Price, 50 cents.

Contains descriptive text, topographi and geologic maps of Chicago and vicinity, and also splendid series of illustrations.

These folios dealing with the geography of the chief cities of the country are of more than local interest. They deserve wide usage, and should be at the service of every teacher in the respective cities.

The Success Handy Reference Atlas and Gazetteer of the World. By Geo. F. Cram, edited by Dr. Eugene Murray-Aaron. 3¾x5¾ in. 103 pages of maps with excellent index. New York: The Success Company, 1902.

A convenient and useful reference atlas of a size to win favor broadly.

Handbook of Climatology. By Julius Hann, translated and enlarged by Robert DeC. Ward. 9x5½ in. Pages xiv + 437. New York: The Macmillan Company, 1903. $3.00 net.

An authoritative translation of the standard work on Climate. To be reviewed later.

NEWS NOTES

Exhibition of Geographical Material.—Early in the year the teachers and superintendent of Malden, Mass. made an exhibition of geographical material for the instruction of the public, which was so creditable that some account should be given of its special features. Each of the several schools undertook to prepare a department under the guidance of their respective principals. One school looked after books on geography; another worked up available pictures; a third had charge of the "loan exhibition." Each school vied in friendly rivalry with the others to make the best possible exhibit. The result of this earnest effort was simply astonishing. To fill the section devoted to the geographical museum the children brought from their homes as a loan thousands of valuable articles of adornment, religious emblems, and curiosities representing nearly every country in the world.

The public crowded the rooms for five days, many teachers going long distances to see, hear, and gain inspiration and help. Great credit is due the teachers, principals, and superintendent of Malden for the hard work they put into the preparation of this exhibit. Nothing of the size and completeness has ever been attempted before in this country.

The Capital of Alaska.—An announcement of more than temporary interest is the transfer of the capital of Alaska from Sitka to Juneau. The development of the gold interest has placed the modern Juneau so far ahead of the interesting and historic Sitka, that business convenience has necessitated the change in the seat of territorial government.

National Educational Association Number

The JOURNAL *of* GEOGRAPHY

The June number of THE JOURNAL OF GEOGRAPHY will be a National Educational Association number. It will be devoted entirely to

THE GEOGRAPHY OF BOSTON

AND VICINITY

And will be of interest to all who expect to attend the meeting of the National Educational Association in July, 1903, as well as to all Boston and Massachusetts people. This number can be used as a supplementary reader in geography in all New England schools.

Among the numerous articles that may be expected are the following:

THE GENERAL GEOGRAPHY OF BOSTON AND VICINITY
By PROFESSOR GEORGE H. BARTON, *President of the Appalachian Mountain Club*

THE COMMERCIAL GEOGRAPHY OF BOSTON
By PHILIP EMERSON, *of the Cobbett School, Lynn, Mass.*

GEOGRAPHIC EXCURSIONS ABOUT BOSTON
By CHARLES F. KING, *of the Dearborn School, Boston, Mass.*

THE PARK SYSTEM OF BOSTON
By ARTHUR A. SHURTLEFF, *of Boston, Mass.*

THE GEOGRAPHICAL DEVELOPMENT OF BOSTON
By F. P. GULLIVER, PH. D., *of the St. Mark's School, Southboro, Mass.*

The articles will be illustrated extensively by photographs and maps; there will be a large folding map of Boston and environs inserted, and the number will be invaluable to all teachers who intend to visit Boston in 1903, or who wish to have well-selected geographic material on Boston available for class use. The number will also include a brief selected bibliography on the geography of Boston, and statistical notes showing the population, commerce, industries, and relative economic importance of Boston and Southern New England.

The price is 20 cents, postpaid

This magazine should be in the hands of every teacher before attending the convention. Order now and be sure of a copy. Copies can be obtained from the publishers, or of all booksellers and at all news stands in Boston during July. Subscriptions and advertisements should be sent to *THE JOURNAL OF GEOGRAPHY*, Room 560, 160 Adams Street, Chicago, Ill., *or* Winona, Minn.

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SOURCES OF
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SOURCES OF GEOGRAPHY, AS OF HISTORY, ARE TWOFOLD—ESTABLISHED MEMORIALS AND CONTINUED INVESTIGATIONS. THE STUDY OF IT HAS THE GREAT ADVANTAGE THAT THE SURFACE OF THE EARTH IS A STANDING MONUMENT OF THE PAST. WHEREVER OUR HOME IS, THERE LIE ALL THE MATERIALS WHICH WE NEED FOR THE STUDY OF THE ENTIRE GLOBE. THE ROARING MOUNTAIN BROOK IS THE TYPE OF THE THUNDERING CATARACT; THE GEOLOGICAL FORMATIONS OF A SINGLE LITTLE ISLAND SUGGEST THE BROKEN COAST LINES OF A CONTINENT; THE STUDY OF THE BOULDERS WHICH ARE SO THICKLY SCATTERED IN TOKEN OF A GREAT PRIMEVAL DELUGE FROM THE NORTH REVEALS THE STRUCTURE OF WHOLE MOUNTAIN CHAINS. THE DIGGING OF EVERY WELL MAY CONTRIBUTE TO OUR KNOWLEDGE OF THE EARTH'S CRUST; THE EXCAVATIONS MADE IN THE BUILDING OF RAILROADS MAY, WITHOUT THE LOSS OF TIME, LABOR, AND EXPENSE, BE A CEASELESS SOURCE OF INSTRUCTION. . . . . THE STUDY OF OUR OWN DISTRICT IS THE TRUE KEY TO THE UNDERSTANDING OF THE FORMS AND THE PHENOMENA OF FOREIGN LANDS. . . . . THE VERY FIRST STEP IN A KNOWLEDGE OF GEOGRAPHY IS TO KNOW THOROUGHLY THE DISTRICT WHERE WE LIVE.—*CARL RITTER.*
Translated by William L. Gage.

FIG. 4. *A view over the Blue Hills Reservation, looking east from the United States Weather Bureau Station (see article, "The Boston Park System," by Arthur A. Shurtleff, page 302).*